

**MANAGEMENT GUIDELINES FOR
MILK RIVER NATURAL AREA
AND
KENNEDY COULEE ECOLOGICAL RESERVE**

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Milk River Valley. L. Allen.
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Preface

The following is a summary of the management guidelines abstracted from the Operational Management Plan for the Milk River Natural Area and Kennedy Coulee Ecological Reserve. Reference should be made to this Management Plan for additional information and rationale.



MANAGEMENT GUIDELINES FOR MILK RIVER NATURAL AREA AND KENNEDY COULEE ECOLOGICAL RESERVE

Background

Together, the Milk River Natural Area and the Kennedy Coulee Ecological Reserve provide a representative example of the Mixed Grassland Natural Region. They differ in that the Ecological Reserve is strictly protected, while the Natural Area offers greater opportunities for public use.

In total, the Natural Area and Ecological Reserve encompass approximately 6400 ha. The composite site is situated in the semi-arid portion of the province and experiences cold winters, warm summers and little precipitation. Topography is varied ranging from undulating and gently rolling plateaus to rolling hills. The canyon of the Milk River valley is a prominent feature, and is one of the deepest in the Canadian plains.

The landscape diversity is further demonstrated by the water bodies, soil and geological formations. The only permanent source of water is the Milk River. However, there are several ephemeral ponds and streams, one of which is Kennedy Creek. The latter is fed by numerous springs. Throughout the site, the diversity of soil types ranges from eroded bedrock with no soil profile to solonchic, chernozemic and gleysolic profiles. Geologically, a number of bedrock formations are exposed along the Milk River valley. The Oldman formation in particular, is rich in paleontological resources. Ultimately, this diversity of landscapes provides for a wide variety of plant and animal communities representative of the Mixed Grassland Natural Region.

The importance of this area is tied to the unique combination of natural and cultural features, which together may be found in no other part of Alberta. Furthermore, the Milk River area has several special biological, physical and cultural features that are rare to Alberta and/or Canada.

The site represented by the Milk River Natural Area and Kennedy Coulee Ecological Reserve has been the focus of various conservation and management concerns for some time. The area was first identified as a representative example of mixed grassland in the 1970s. A nongovernmental task force was established to develop management guidelines for the site.

One of the recommendations of the task force referred to formation of a management committee. Such a committee was established in 1990 and one of its first tasks was to prepare a management plan for the site. This plan is the result of efforts by the Milk River Management Committee.

Management Intent

The primary intent for the Milk River Natural Area and Kennedy Coulee Ecological Reserve is to **protect and maintain the ecological and aesthetic character of a representative example of the mixed grassland region with minimal human interference**. This intent ties in with the goals of the Prairie Conservation Action Plan.

Management Strategies

Some historical natural processes are not repeatable, under current circumstances. Activities, both natural and man-induced, must be managed to induce correction, guidance or prevention. With this in mind, the following management strategies have been prepared (Table 1). Where the management strategies for the Natural Area differ from those of the Ecological Reserve, such differences are distinguished. For further clarification related to these strategies, refer to the plan itself.

Although **fire** is a natural part of a grassland ecosystem, prescribed burning is not under consideration at this time. Wildfires will be suppressed. Fire management plans will be prepared for both prescribed burns, should one be necessary, and wildfires. **Manipulation of habitat and species**, both flora and fauna, will not be considered unless required for management purposes. **Reintroductions of indigenous species, such as swift fox**, will be encouraged provided that such efforts do not adversely affect other significant species or their habitats.

Suppression of **exotic species/pests** may occur according to current legislation to protect features within and outside the site. Mechanical means of suppression are encouraged, but chemical controls are advocated if the former are not practical. Natural regeneration processes constitute the preferred approach to **reclamation**. However, should this approach prove ineffective, reclamation of disturbed areas is still restricted to the use of native species, not exotics.

Education and research are allowed on both sites. Research activities may require a permit and/or authorization from one or more agencies, depending on the nature of the activity.

Zero-impact **camping** will be permitted but not encouraged. Campfires will be discouraged in the Natural Area and will not be allowed in the Ecological Reserve. Under current legislation, **hunting** is permitted in the Natural Area but is not allowed in the Ecological Reserve, unless it is required for management purposes. **Motorized vehicles** are not allowed in the Ecological Reserve except for emergencies and for management and research purposes. On the Natural Area, drivers of motorized vehicles are encouraged to stay on the recommended route, but motorized vehicles are not allowed west of the route except during emergencies and when needed for designated management and research activities.

Grazing by cattle will be used as a management tool to perpetuate the ecological character of the area. The Ecological Reserve will be maintained by lightly grazed to ungrazed conditions and thus will provide habitat for a number of species dependent on the desired type of grassland structure. Grazing in the Ecological Reserve will be used only where required for management purposes and consideration will be given to the sensitivity of the springs and seepage areas in Kennedy Coulee. The grazing strategy for the upland portion of the Natural Area will provide for a broader range of grassland habitats. At this time, no further range developments are allowed. In the best interest of stewardship, the ideal arrangement for grazing would be to have a long-term grazing contractor. Should this not be feasible, grazing will be

allotted by annual tender. Practicality dictates that grazing in the valley will continue by Lost River Ranches.

All activities associated with commercial **resource exploration and extraction**, along with **linear developments**, have significant impacts on the natural features, are incompatible with the overall management intent of both sites and are, therefore, not permitted.

Signage will be kept to the minimum required to ensure public safety, encourage compliance with management decisions, direct public access and provide basic interpretive information.

Fencing will be kept to a minimum and will be used only where alternative methods of controlling cattle are not feasible. A fence has been erected separating the Natural Area from the Ecological Reserve. This was done to protect the sensitive seepage areas of Kennedy Coulee and to ensure the perpetuation of ungrazed habitat.

There will be no **facility development** in the Ecological Reserve and there is no intention of establishing facilities in the Natural Area. If there is a demand for facility development, the type and placement will be determined by the Milk River Management Committee and included in a future plan update and amendment.

Program Support

Education of users, through signs and brochures, will be done to encourage adherence to the management guidelines as outlined in this plan. Should education efforts prove to be ineffective, regulations may be required.

Transects for long-term **monitoring** of vegetation and wildlife will be established by consultants to measure the effectiveness of management strategies and to direct future management decisions. Regular, on-site monitoring to evaluate user impact is necessary and will be done primarily by Public Lands Division and/or Fish and Wildlife Division with the aid of the Milk River Management Committee, volunteer stewards and the grazing contractor.

Implementation

This plan was coordinated by the Public Lands Division of Alberta Forestry, Lands and Wildlife, under the direction of the Milk River Management Committee. Various agencies and members of the public had an opportunity to comment on this plan at stages throughout its development. The Milk River Management Committee, or its successor, will ensure the implementation of the plan and will guide future strategies.

Table 1. Significant Features of Value

MILK RIVER NATURAL AREA	KENNEDY COULEE ECOLOGICAL RESERVE
diversity of relatively undisturbed natural grasslands and plant and animal communities representative of the Mixed Grassland Natural Region	representative example of relatively undisturbed mixed grassland
woodland communities on sheltered coulee slopes and river valley	woodland communities on sheltered coulee slopes
ephemeral sandy wetlands	ephemeral wetlands
meander scars and oxbow ponds in river valley and associated aquatic communities	numerous springs and seepage areas along Kennedy Creek
Milk River canyon and associated features; badland topography, crystalline boulders, concretions	Comrey Sandstone outcrops and cliffs along Kennedy Creek
rare plants and animals	rare plants
panoramic views	panoramic view of Sweetgrass Hills
fossiliferous exposed bedrock formations	archeological sites in the context of their original landscape including vision quests
intrusive igneous dike	
wildland character and isolated, remote, solitary and quiet setting	

* The completion of a biophysical inventory for the Ecological Reserve may uncover other significant features presently unknown.

Table 2. Management Issues and Strategies.

MANAGEMENT ISSUES	MANAGEMENT STRATEGIES KENNEDY COULEE ECOLOGICAL RESERVE	MANAGEMENT STRATEGIES MILK RIVER NATURAL AREA
Fire	- prescribed burning permissible for management purposes, but not recommended at this time - no open fires - preparation of fire management plan before implementation of prescribed burn - recommend preparation of fire management plan to address suppression of wildfires - suppression of wildfires	- prescribed burning permissible for management purposes, but not recommended at this time - campfires discouraged - preparation of fire management plan before implementation of prescribed burn - recommend preparation of fire management plan to address suppression of wildfires - suppression of wildfires
Habitat Manipulation	- no habitat manipulation unless required for management purposes	- no habitat manipulation unless required for management purposes. Adequate controls and monitoring protocols will be in place before implementation of such a program.
Species Manipulation	- no manipulation of species unless required for management purposes	- no manipulation of species unless required for management purposes. Adequate controls and monitoring protocols will be in place before implementation of such a program.
Native Species Reintroduction	- reintroduction of indigenous species encouraged provided that other rare, threatened or significant species or their habitats are not adversely affected	- reintroduction of indigenous species encouraged provided that other rare, threatened or significant species or their habitats are not adversely affected
Exotic Species/Pest/Disease Control	- suppression of exotic species/pests and diseases may occur as required to protect features of the site and to protect private interests outside the site - chemical controls to be used if mechanical means of suppression are unsuccessful. Restricted weeds will be destroyed, noxious and nuisance weeds will be controlled.	- suppression of exotic species/pests and diseases may occur as required to protect features of the site and to protect private interests outside the site - chemical controls to be used if mechanical means of suppression are unsuccessful. Restricted weeds will be destroyed, noxious and nuisance weeds will be controlled
Reclamation	- natural regeneration - restricted to species indigenous to the site	- natural regeneration - restricted to species indigenous to the site

MANAGEMENT ISSUES	MANAGEMENT STRATEGIES KENNEDY COULEE ECOLOGICAL RESERVE	MANAGEMENT STRATEGIES MILK RIVER NATURAL AREA
Education and Research	- educational use allowed but not promoted - nondestructive research permitted - collections require permit authorized by the Minister of Tourism, Parks and Recreation, in some cases a permit from Fish and Wildlife, and for archeological and paleontological resources the Minister of Culture and Multiculturalism	- educational use allowed but not promoted - nondestructive research permitted - collections require permit authorized by the Minister of Tourism, Parks and Recreation, in some cases a permit from Fish and Wildlife, and for archeological and paleontological resources the Minister of Culture and Multiculturalism
Camping	- zero-impact camping permitted but not encouraged	- zero-impact camping permitted but not encouraged
Hunting	- no hunting unless required for management purposes	- permitted - administered by Fish and Wildlife Division
Motorized Vehicles	- prohibited except in emergencies and for management and research activities	- on recommended routes, off trail use monitored - no vehicular access west of the trail except for emergencies and management/research activities, including grazing management
Grazing	- no grazing unless required for research and/or management purposes - consideration will be given to the sensitivity of springs and seepage areas within Kennedy Coulee - no development at present time - placement of water sources to be determined by management committee	- grazing for management purposes only - grazing in upland portion done ideally under long-term contract or, in lieu of such, by annual tender - grazing in valley to continue by Lost River Ranches - no development at present time - need for additional water sources to be determined by management committee
Minerals and Aggregate	- no exploration or extraction	- no exploration or extraction except for area of freehold
Linear Development	- no new linear developments such as bladed or graded road development, pipelines or power lines	- no new linear developments such as bladed or graded road development, pipelines or power lines
Signs	- small boundary signs on fence encircling Ecological Reserve - information on sign at entrance to Natural Area	- one main sign at entrance to Natural Area plus small signs in right-of-ways at Black Butte turn off of Secondary Highway 880, at "Brower's corner", at Pinhorn corrals and north of the Pinhorn corrals, plus sign at terminus of recommended route, plus sign on river flats - gates signed "Please leave gates as found" - need for signs indicating foot access to the Ecological Reserve to be determined in the future

MANAGEMENT ISSUES	MANAGEMENT STRATEGIES KENNEDY COULEE ECOLOGICAL RESERVE	MANAGEMENT STRATEGIES MILK RIVER NATURAL AREA
Fencing	- all fencing kept to a minimum	- all fencing kept to a minimum - one fence separates the Natural Area from Kennedy Coulee and small fences have been placed at the heads of two coulees - fence locations and need for additional fencing to be reviewed by the Milk River Management Committee
Facilities	- no facilities	- none planned
Monitoring	- done in conjunction with Natural Area	- responsibility of Milk River Management Committee, primarily Public Lands Division and/or their designate -- long-term vegetation and wildlife plots to be established before initiation of grazing and revisited annually
Communications	- general site brochure will be developed jointly for both Natural Area and Ecological Reserve - information sign at entrance to Natural Area	- general site brochure will be developed jointly for both Natural Area and Ecological Reserve - information sign at entrance to Natural Area
Administration	- management advice provided by the Milk River Management Committee and the Ecological Reserves Coordinating Committee	- management advice provided by the Milk River Management Committee

Table 3. Matrix Outlining Agency/Organization Responsibilities.

	Public Lands	Natural and Protected Areas	Fish & Wildlife	Prov.* Park Serv.	County of Forty Mile	Mgmt. Cmt.
suppress wildfires	C			C	A	
preparation of fire mgmt. plan for suppression of wildfires	C	C		A	A	C
habitat manipulation	C	A	A	A		C
species manipulation	C	A	A	A		C
native species re- introduction	C	A	A	A		C
reclamation	A	C	C	A		C
educational use (permits)	C	A	A	A		
research use (permits)	C	A	A	A		C
trail location & amendments	C	C				A
signage	A	A		A	C	C
grazing - implementation & mgmt.	A	A		A		C
fencing	A	A		A		C
monitoring use	A			C		A
monitoring long-term plots	A	A	C	A		C
communications		A		A		C
off-highway vehicle use (monitoring)	A		A	C		A
hunting			A	A		C
camping (monitoring)	A			C		A
exotic species/pest control		C		A	A	C

A - approval - refers to main agencies. The number of agencies required for approval may depend on the activity and where it is to take place.

C - consultative

* Ecological Reserve only

Figure 1. Planning Process Flow Chart

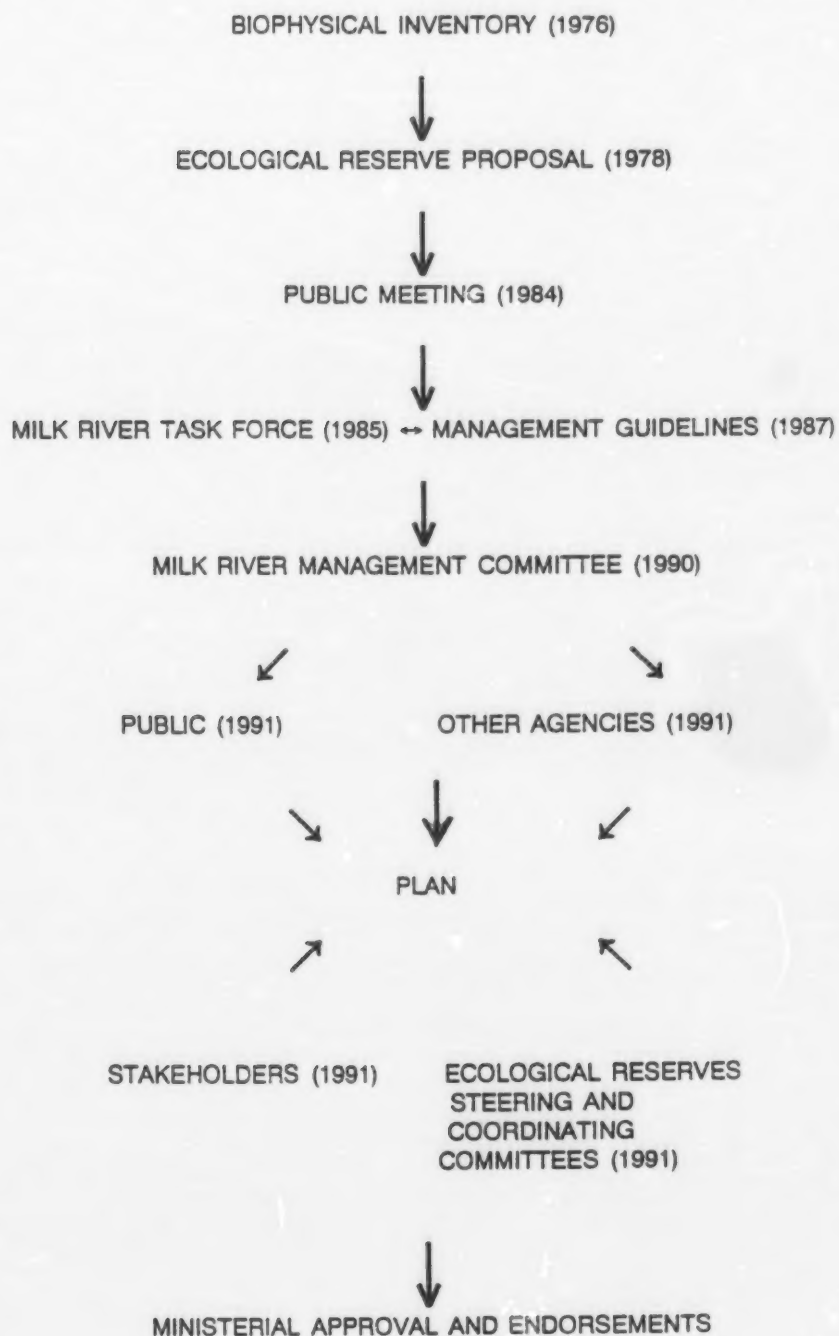
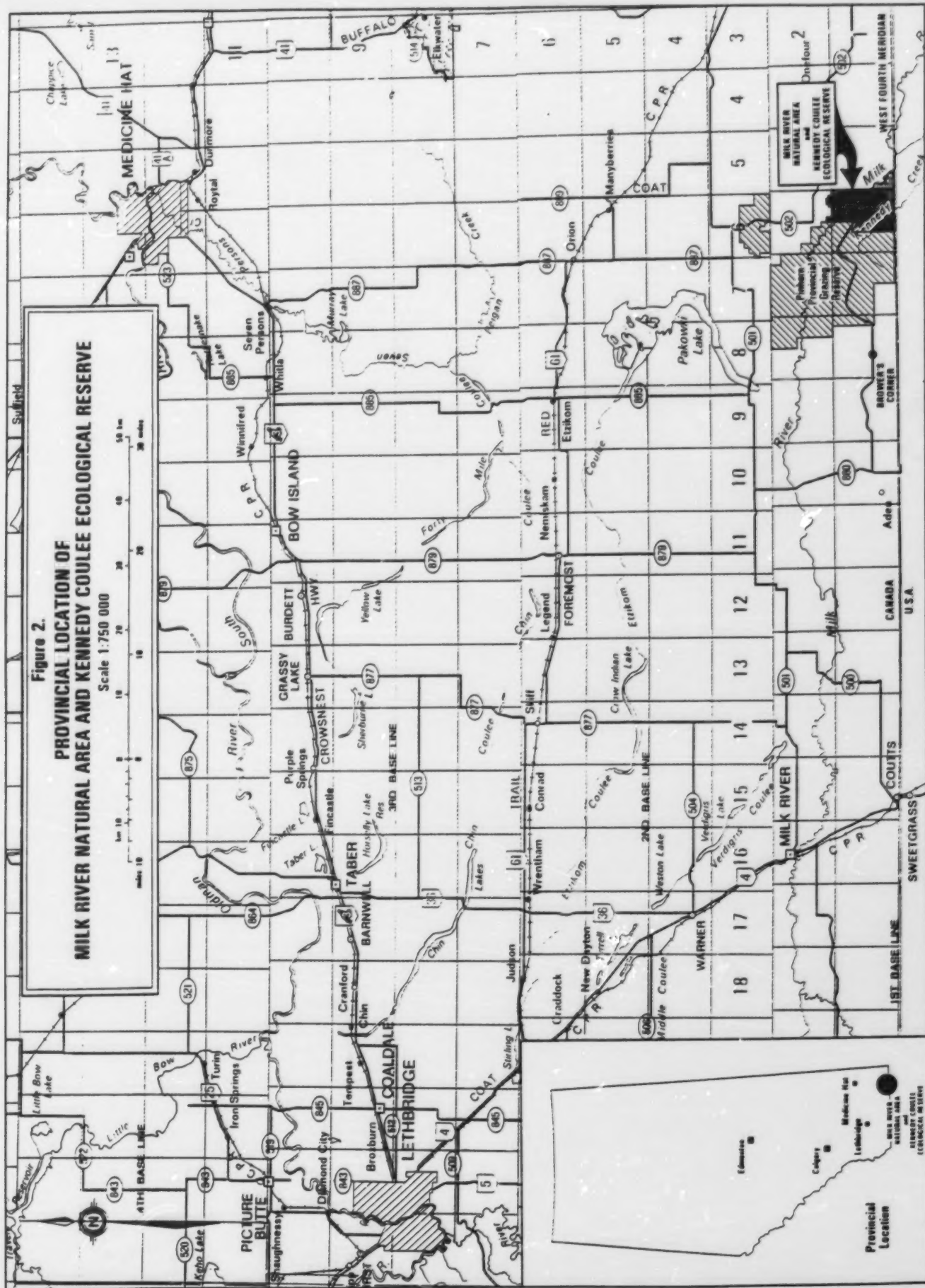


Figure 2.
PROVINCIAL LOCATION OF
MILK RIVER NATURAL AREA AND KENNEDY COULEE ECOLOGICAL RESERVE

Scale 1:750 000

10 20 30 40 50 km
 10 20 30 40 miles



Provincial Location

Figure 3.

**MILK RIVER NATURAL AREA
AND
KENNEDY COULÉE ECOLOGICAL RESERVE
LANDSCAPE FEATURES**
(Compiled from: Walls et al. 1989; Barclay et al. 1989)

Scale: 1:50 000
WEST FOURTH MERIDIAN

LEGEND

- Natural Area Boundary
- Ecological Reserve Boundary
- Recommended Route
- Fence Lines
- Dugouts
- Seismic Line or Trail
- Contour Interval 50 Metres

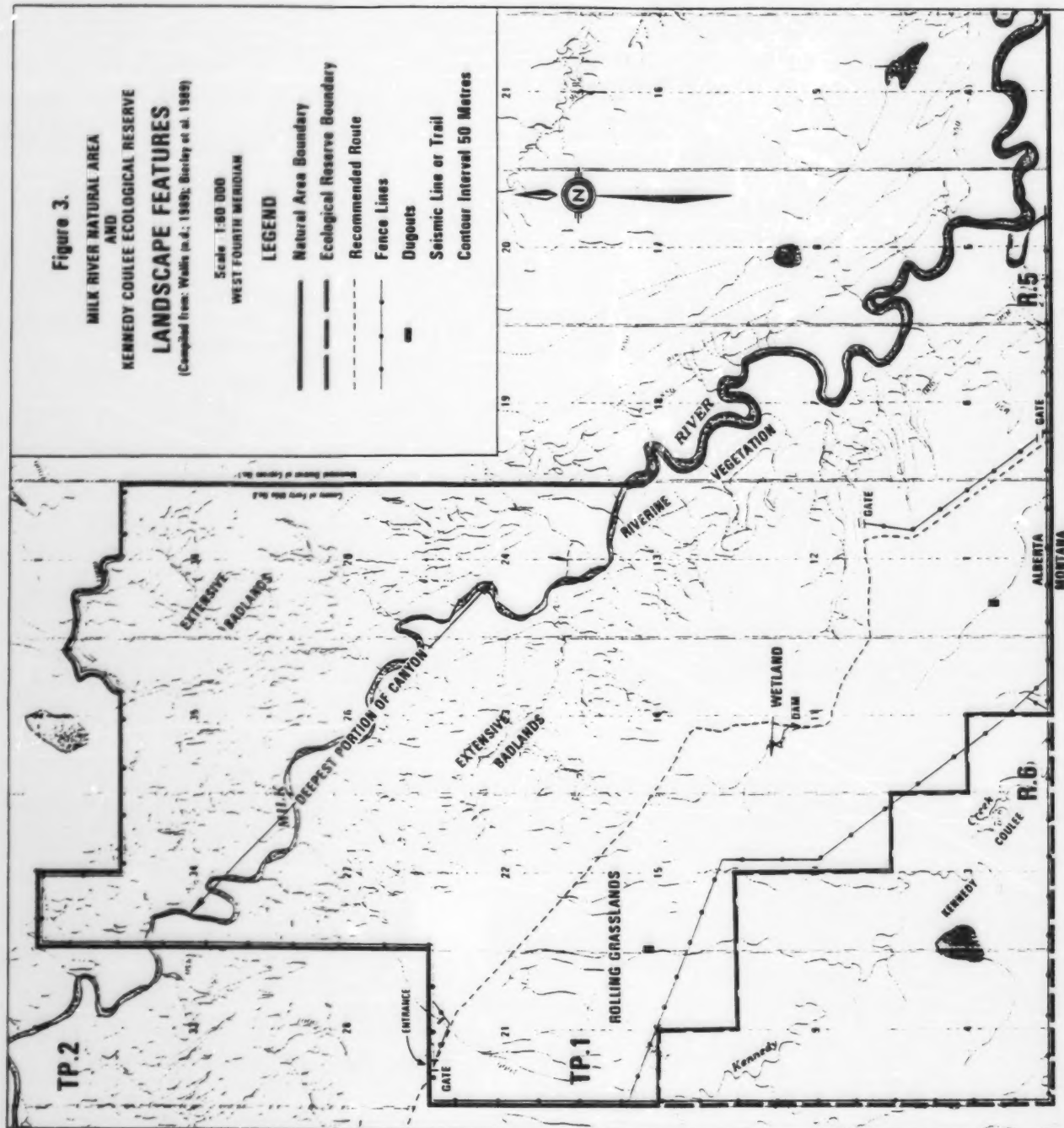


Figure 4.

**MILK RIVER NATURAL AREA
AND
KENNEDY COULEE ECOLOGICAL RESERVE
EXISTING DEVELOPMENT**

Scale 1:50 000
WEST FOURTH MERIDIAN

LEGEND

- Natural Area Boundary
- - - Ecological Reserve Boundary
- - - Recommended Route
- · · Fence Lines
- Dugouts
- Seismic Line or Trail
- Contour Interval 50 Metres

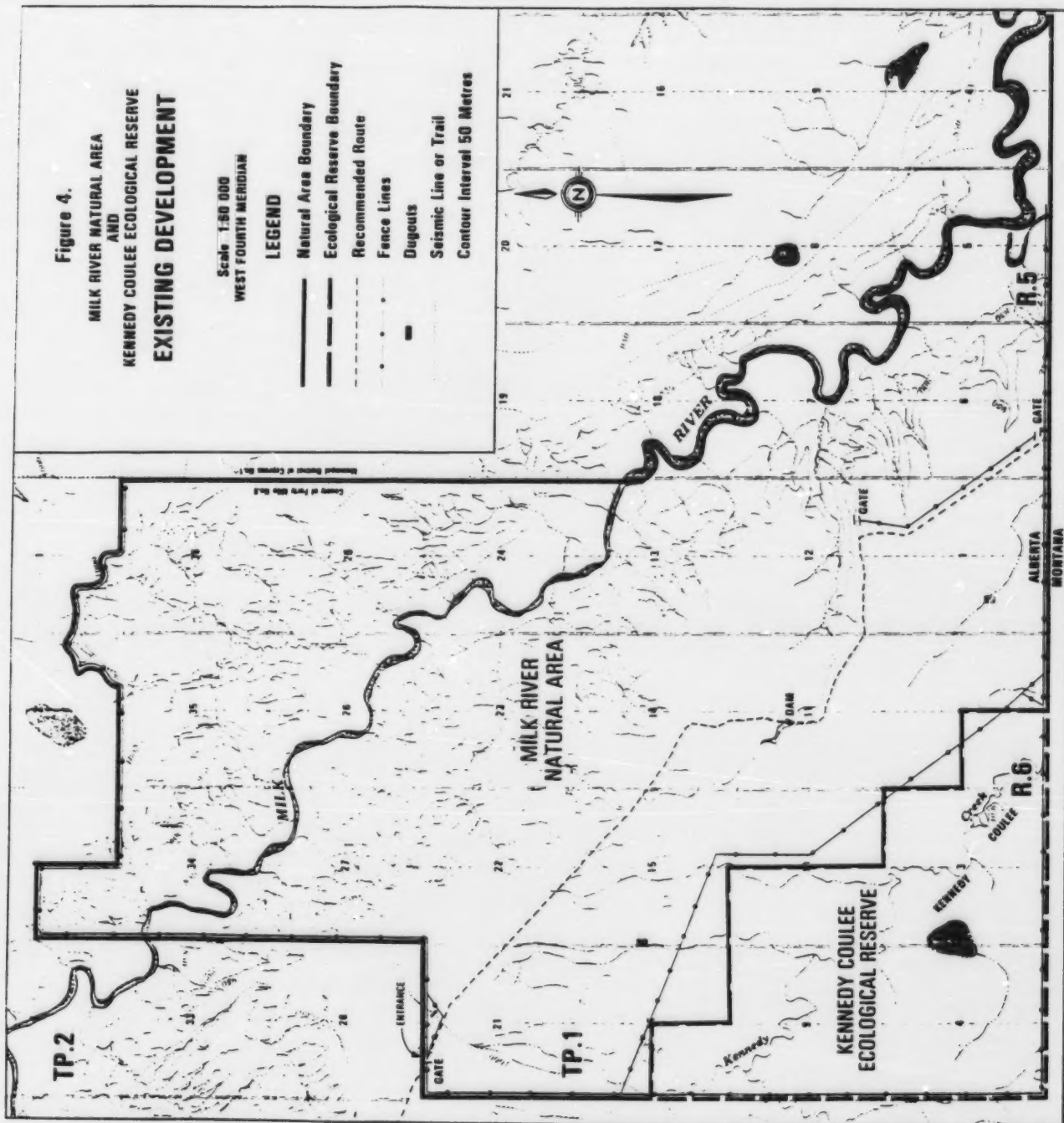
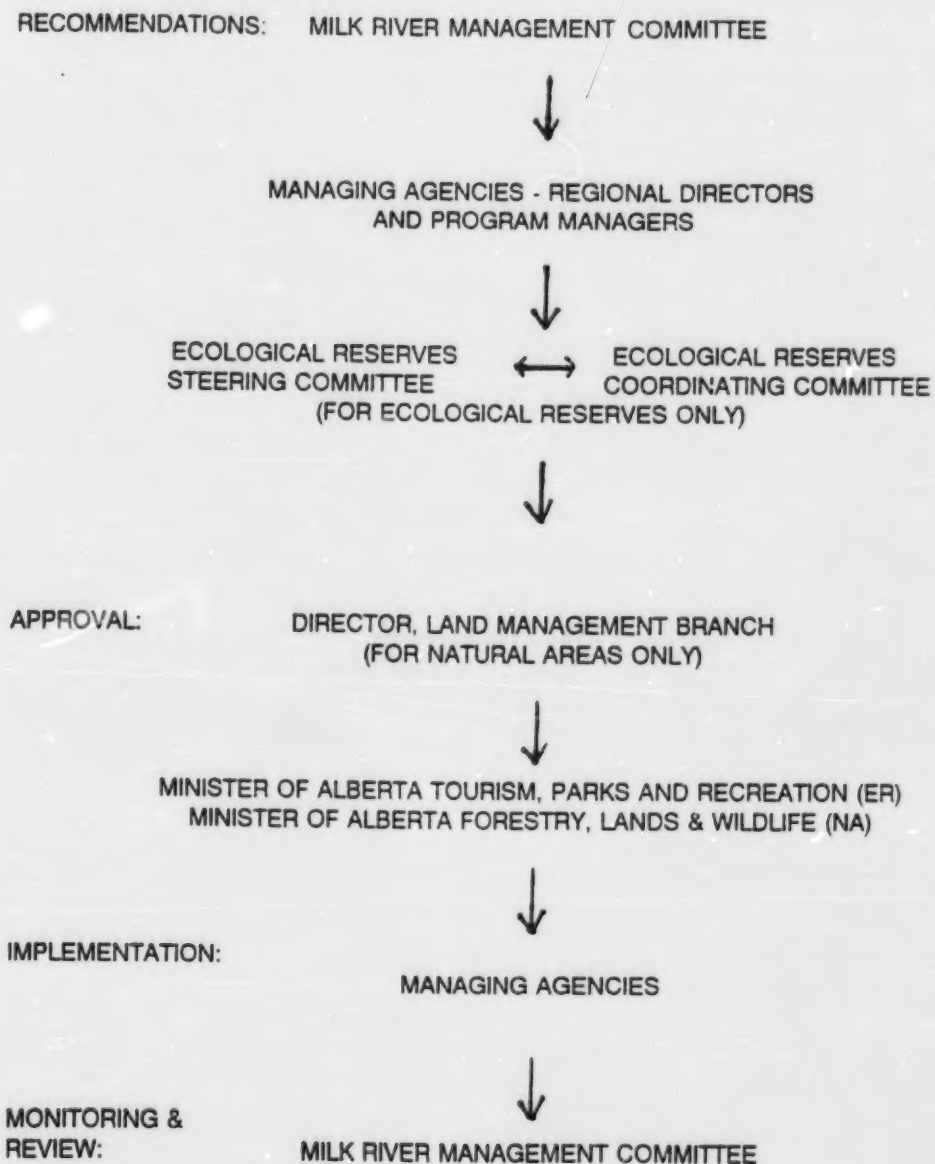


Figure 5. Management Activity Approval Process





**OPERATIONAL MANAGEMENT PLAN
MILK RIVER NATURAL AREA
AND
KENNEDY COULEE ECOLOGICAL RESERVE**

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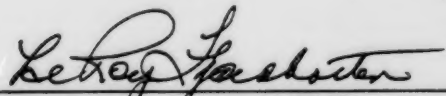
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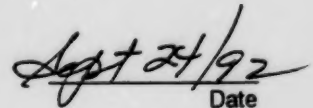
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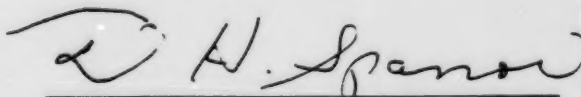
Cover page photo:
Milk River Valley. L. Allen.
Natural and Protected Areas,
Alberta Forestry, Lands and Wildlife

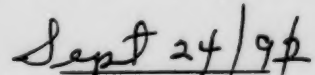
APPROVAL STATEMENT

The Operational Management Plan for Milk River Natural Area and Kennedy Coulee Ecological Reserve is the official policy of the Government of Alberta for the management of the Natural Area and Ecological Reserve. The plan provides the direction for management of the Natural Area and Ecological Reserve consistent with provisions in the *Wilderness Areas, Ecological Reserves and Natural Areas Act*. Approval of this plan reflects the Government's commitment to conserve the natural features and ecological diversity of the Milk River Natural Area and Kennedy Coulee Ecological Reserve for present and future generations.


Minister, Forestry, Lands and Wildlife


Date

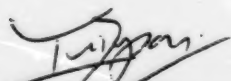

Minister, Tourism, Parks and Recreation


Date



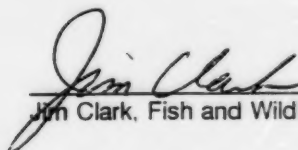
ENDORSEMENT

Recognizing the value of the "Milk River Natural Area" and the "Kennedy Coulee Ecological Reserve" for conservation purposes as discussed in this document, we, the Milk River Management Committee, hereby endorse the Milk River Natural Area and Kennedy Coulee Ecological Reserve Operational Management Plan as an outline of the general policy and management intent for the site.



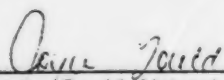
Ian Dyson, Chairman

24 March '92
Date



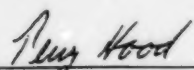
Jim Clark, Fish and Wildlife Division

24 March 92
Date



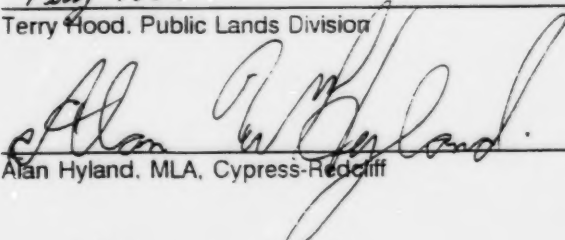
Joyce Gould, Natural and Protected Areas

24 March 92
Date



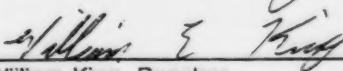
Terry Hood, Public Lands Division

24 March/92
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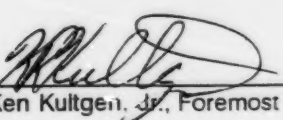
Alan Hyland, MLA, Cypress-Redcliff

April 2/92
Date



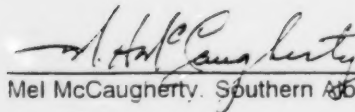
William King, Rancher

March 26/92
Date

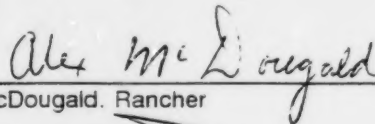


Ken Kultgen, Jr., Foremost Fish and Game Association

24 Mar/92
Date

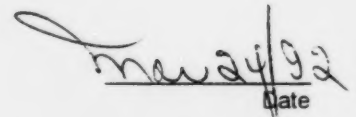

Mel McCaugherty, Southern Alberta Environmental Group

92/03/24
Date


Alex McDougald, Rancher

March 24/92
Date


Leonard Mitzel, County of Forty Mile


Date


Doug Ohrn, Alberta Tourism, Parks and Recreation

24 March 1992
Date


Cliff Wallis, Alberta Wilderness Association

March 24/92
Date

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1.0 INTRODUCTION

1.1 Background

"Less than 1/3 of the native range still remains, good portions of which are not managed in an ecologically sensitive manner. Some of the best native grasslands which remain are those found on large leaseholds or large private rangelands. The proposed area along the Milk River Canyon was a part of a large leasehold but now is 'vacant' Crown land ...

The proposed area has some of the least disturbed and most remote areas in the grassland region. It has been classified as a natural landscape of national significance and it contains an incredible diversity of geological, biological and archeological features. These features extend well beyond the bounds of the proposed area, from the well-managed rangelands to the west of the Pinhorn Grazing Reserve east to the unique ecosystems and endangered species along the Lost River." (Milk River Task Force 1985).

In addition to the features mentioned above, what is inherent to this unique area is perhaps the most difficult concept to convey on paper. That is the "feeling" one gets when exposed to an area that offers so much in terms of beauty, vastness, assembly of natural features and remoteness. The Milk River area offers a unique opportunity to experience a remnant of the original prairie ecosystem.

The Milk River Natural Area and Kennedy Coulee Ecological Reserve have been at the focus of various conservation and management concerns for some time. In 1971, the Alberta Wilderness Association began to lobby for protection of a much larger area known as the Milk River-Lost River Region (Johnston 1984). A review of 1974 aerial photography revealed this region to be one of the last remaining blocks of relatively undisturbed native grassland. This sparked the interest of both provincial and federal governments resulting in numerous evaluations and studies during the mid to late 1970s.

Parks Canada identified the Milk River Canyon area as a "Natural Area of Canadian Significance", along with the Val Marie-Kildeer area and Cypress Hills, representing the grasslands natural region. The Val Marie area was eventually chosen as the site for Grasslands National Park and Parks Canada turned their attention away from the Milk River region (Johnston 1984).

Alberta Recreation, Parks and Wildlife undertook a comprehensive study of the area to determine its value as a representative sample of the Mixed Grassland Natural Region (Wallis 1976). As a result of that study, recommendations were made for the establishment of some sort of park to preserve the natural attributes of the area. Alberta Recreation, Parks and Wildlife proposed a 360 square kilometre preservation park complete with campground, interpretive facilities and a substantial buffer zone (Alberta Recreation, Parks and Wildlife 1976). This proposal met with some resistance from various interest groups, including the local fish and game association who were concerned about the possibility of hunting restrictions on this large area. Nothing more was done with this proposal.

Around 1978, the Milk River-Kennedy Coulee area was considered by the Alberta Government as a candidate ecological reserve, one of the first in Alberta. At this time, amendments to the *Wilderness*

Act of 1971 were under consideration in order to allow such status (Johnston 1984). Bill 55 included amendments to the act and final passage came on January 5, 1982. This did not resolve the controversy surrounding the Milk River-Kennedy Coulee area. Both the size and the restrictions that would be placed on such traditional activities as grazing and hunting raised a great deal of concern within the local community. These concerns led to considerable delay in the establishment of protective status for the area.

In an attempt to solicit all concerns, a public meeting was held in 1984, at which over 70 submissions were presented. Despite the controversial nature of the meeting, it was surprising that the vast majority of both the ranching community and the environmental sector agreed that the area deserved some sort of protective status. The question has always been, What is the best mechanism to accomplish this goal?

The public meeting in 1984 resulted in the formation of a nongovernmental task force consisting of key stakeholders such as the local ranching community, Foremost Fish and Game Association, the Alberta Wilderness Association and academia. This Milk River Task Force made several recommendations to the government for managing and protecting the ecological and aesthetic character of this area, one of which led to the establishment by Order in Council of a small ecological reserve bordered by a larger natural area in 1987. In addition, the task force recommended the establishment of a management committee, composed of government and nongovernment personnel, to prepare a management plan for this area.

It is clear that the preparation of a management plan to protect such values and features, while trying to consider other uses, is indeed a formidable task. Several stakeholders, those who believe that this area deserves protection for the benefit of present and future generations, have put aside their personal biases to work together in a cooperative manner to accomplish such protection. They have devoted a great deal of time to ensure the high quality of this important ecosystem is maintained; their efforts should be commended. Those participants include everyone from our predecessors on the Milk River Task Force, interested agencies and members of the general public, to those who have the power to approve such a plan. In particular, recognition must be given to the local ranchers whose management over the years has been instrumental in preserving the Milk River area as one of the best native grassland ecosystems in North America.

1.2 Prairie Conservation Action Plan

The future of Canada's prairies and parklands has become an issue of national importance. Since 1986, a number of agencies and organizations have worked together to develop and implement the Prairie Conservation Action Plan (PCAP), a comprehensive approach to prairie conservation and management in Canada (World Wildlife Fund Canada 1988).

In the PCAP, conservation means maintaining the ecological conditions to renew living things and to replenish soil, water and air. It means a balance between the uses of land for economic activities and for natural processes of renewal and replenishment.

The plan states 10 major goals "that provide a blueprint for prairie wide conservation and management efforts". These goals are well matched to the general philosophy and intent of Alberta's legislation for natural areas and ecological reserves (*Wilderness Areas, Ecological Reserves and Natural Areas Act*), which is similarly directed towards natural resources conservation and management.

Ecological reserve status was accorded to part of the area because it contains features representative of the Mixed Grassland Natural Region. Part of the area has been designated as a Natural Area to protect various special biophysical features and also to provide a buffer for the reserve (Brierley et al. 1989). The establishment of these areas contributes to the fulfilment of the goals and actions proposed in the PCAP which has been endorsed by the Minister of Alberta Forestry, Lands and Wildlife.

1.3 Management Intent

The primary intent for the Milk River Natural Area and Kennedy Coulee Ecological Reserve is the following:

to protect and maintain the ecological and aesthetic character of a representative example of the Mixed Grassland Natural Region with minimal human interference.

More specifically, this intent would encompass three components:

- a) maintain ecological diversity, ecological processes, native species and habitats;
- b) protect rare and significant natural features and to maintain species and habitats; and
- c) ensure the availability of public land in a natural state for use by the public for recreation, education, scientific research or any other purposes where compatible with the primary intent of protection.

Ecological Reserve

The management intent for the ecological reserve is to foster and maintain a mixed grassland ecosystem in climax condition. Because of its location with respect to the Natural Area, the Ecological Reserve serves as a core area, for which the role will be to provide habitat for plant and animal species associated with taller grasses and greater levels of litter. Particular consideration will be given to the sensitivity of the springs and seepage areas in Kennedy Coulee.

Natural Area

The management intent for the Natural Area is to foster and maintain a mixed grassland ecosystem with a diversity of habitats for plant and animals species associated with either short or tall grasses. It buffers the north and east sides of the Ecological Reserve, yet is less restrictive in terms of the types of activities permitted. Management activities that promote habitat diversity without compromising the main conservation objective will receive serious consideration.

The above intents are to be used by the management committee to provide the overall framework underlying management decisions for both the Natural Area and the Ecological Reserve. However, some flexibility has been built into legislation covering Natural Areas and also for ecological reserves.

though less so for the latter. This allows decision-makers a certain amount of latitude to tailor management strategies to suit the specific circumstances of a given area. For example, special management practices such as controlled grazing, which at first glance may seem contradictory to the primary intent of protection, may be required to simulate natural processes.

1.4 What is a Natural Area?

Natural Areas are protected public lands, set aside with the main objective of preserving their natural features. Natural Areas bridge the gap between strictly protected areas such as ecological reserves and those lands intensively developed for recreation such as provincial recreation areas.

The *Wilderness Areas, Ecological Reserves and Natural Areas Act* states that any area of public land can, by regulation, be designated as a Natural Area: "to protect sensitive or scenic lands from disturbance" and to "ensure the availability of public lands for conservation, recreation, education or any other purpose."

Natural Areas are, by policy, divided into three broad categories: education, conservation and recreation. Milk River Natural Area is categorized as a conservation Natural Area. Its management emphasizes conservation but also supports public appreciation, education, research and/or recreation when these are compatible with the main objective.

1.5 What is an Ecological Reserve?

Ecological reserves are established under the *Wilderness Area, Ecological Reserves and Natural Areas Act* RSA.1981 to preserve land for ecological purposes. They are protected natural landscapes set aside to preserve representative examples of the natural regions of Alberta. The prime objective is to achieve representation of Alberta's natural landscapes and of the associated genetic diversity. Ecological reserves are strictly protected to ensure that the natural features they contain are maintained in the long term, with the understanding that certain special management practices, which may superficially appear to contradict this purpose, may be required to simulate natural processes.

1.6 What is This Management Plan All About?

The preparation of this plan was coordinated by Alberta Forestry, Lands and Wildlife with the cooperation of the Milk River Management Committee. This was done in consultation with the public users of and agencies interested in the Milk River Natural Area and Kennedy Coulee Ecological Reserve. The potential of increased use may result in more pressure on the resources of the Natural Area, both in impacts on the site itself and in reduced and perhaps conflicting opportunities for users. Managers and the public have become increasingly concerned about these impacts and changes in natural conditions and experiences. To resolve the concerns and special considerations, some of which are outlined above, a site-specific management plan was required.

The Milk River Natural Area and Kennedy Coulee Ecological Reserve Management Plan is a document designed to guide the future use and management of the sites. The aim is to ensure the long-term protection of the Natural Area and Ecological Reserve. The document assesses the existing biophysical resources and values of the site (see Table 1), reviews existing land uses, establishes the management intent, identifies management objectives, appropriate uses and guidelines required to fulfill that intent, and discusses the necessary administrative and program support required to implement the plan. The plan also identifies information gaps requiring additional evaluation or research.

This management plan has been prepared on the basis of existing information. As new information becomes available, the management plan may require amendment.

1.7 What Process was Used to Develop This Plan?

The development of this plan was coordinated by staff of the Public Lands Division of Alberta Forestry, Lands and Wildlife. The following steps, summarized in Figure 1, were undertaken:

- a) research background file information;
- b) interview interested agencies and public users;
- c) identify management concerns, public issues and overall direction for both the Natural Area and Ecological Reserve. Particular attention was given to the recommendations submitted by the Milk River Task Force (1985) (see Section 1.1) and the Terms of Reference for the Kennedy Coulee Ecological Reserve (1988);
- d) prepare a draft plan by Milk River Management Committee;
- e) review of revised plan by appropriate agencies and public users;
- f) revise draft plan;
- g) prepare final plan; and
- h) obtain approval by the major managing agencies and public users.

Table 1. Significant Features of Value

MILK RIVER NATURAL AREA	KENNEDY COULEE ECOLOGICAL RESERVE
diversity of relatively undisturbed natural grasslands and plant and animal communities representative of the Mixed Grassland Natural Region	representative example of relatively undisturbed mixed grassland
woodland communities on sheltered coulee slopes and river valley	woodland communities on sheltered coulee slopes
ephemeral sandy wetlands	ephemeral wetlands
meander scars and oxbow ponds in river valley and associated aquatic communities	numerous springs and seepage areas along Kennedy Creek
Milk River canyon and associated features: badland topography, crystalline boulders, concretions	Comrey Sandstone outcrops and cliffs along Kennedy Creek
rare plants and animals	rare plants
panoramic views	panoramic view of Sweetgrass Hills
fossiliferous exposed bedrock formations	archeological sites in the context of their original landscape including vision quests
intrusive igneous dike	
wildland character and isolated, remote, solitary and quiet setting	

* The completion of a biophysical inventory for the Ecological Reserve may uncover other significant features presently unknown.

Figure 1. Planning Process Flow Chart



2.0 OVERVIEW

2.1 Location of Plan Area and Nature of Surrounding Land Use

The Milk River Natural Area contains approximately 5344 ha. (13 205 ac.) and the Kennedy Coulee Ecological Reserve contains approximately 1036 ha (2560 ac.). Both of these parcels of land are located within the Mixed Grassland Natural Region of southeastern Alberta (Achuff et al. 1988). More specifically these lands are situated approximately 160 km (100 mi.) south of Medicine Hat, straddle the Milk River and are bounded on the west by the Pinhorn Provincial Grazing Reserve and on the south by the international border between Canada and the United States of America (Figure 2).

Most of the surrounding land is in its natural state or altered slightly by ranching operations. Cattle ranching is the primary use of most of the surrounding land with the exception of cultivated farmland south of the border, in the United States.

2.2 Biophysical Resources

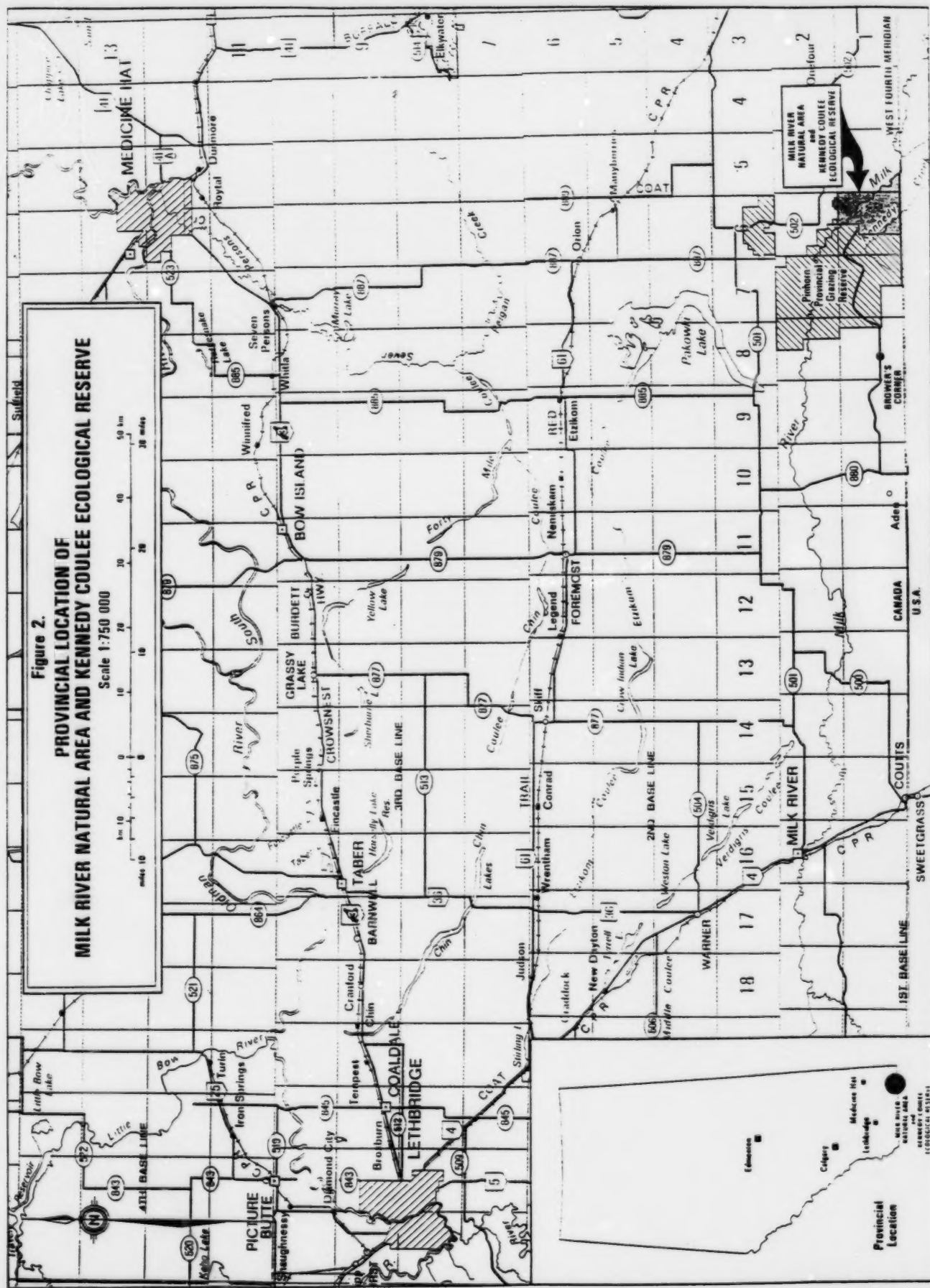
2.2.1 Climate

The Milk River Natural Area and the Kennedy Coulee Ecological Reserve are situated in the semi-arid portion of the province of Alberta (Bowser et al. 1963). Generally, this area has a continental prairie climate characterized by cold winters, warm summers and low precipitation. Both summer and winter precipitation levels are the lowest in the province.

In addition to precipitation, other factors such as latitude, elevation, storm tracks, wind occurrence, heat and moisture availability have all combined to create a climate regime that has been broadly described as the Mixed Grassland Natural Region (Brierley et al. 1989).

The mean yearly precipitation is 340 mm with a range of 260 mm to 380 mm. It has the lowest mean summer precipitation (210 mm) of any area in the province with a range between 170 mm to 250 mm. The mean May to September temperature is 15°C with a range from 14.5° to 16.0°C. The warmest month is July with a mean temperature of 18.5°C and a range of 17.5° to 20.0°C. Thus, it has the warmest summer conditions of any portion of the province (Strong and Leggat 1981).

Figure 2.
PROVINCIAL LOCATION OF
MILK RIVER NATURAL AREA AND KENNEDY COULEE ECOLOGICAL RESERVE
 Scale 1:750 000



The high summer temperatures, low precipitation, strong winds, and high insolation combine to produce high potential evapotranspiration rates and a large climatic moisture deficit (300 mm). This deficit is the most extreme of any region in the province.

Several aspects of the winter climate are worth noting. The cold, mean winter temperatures (-10.5°C from December to February), when coupled with shallow snow cover, lead to very harsh winter conditions for vegetation. Winter temperatures are often moderated by warm, dry chinook winds, which occur in this area at an average frequency of 20 chinook days per year.

2.2.2 Physiography and Hydrology

The Milk River Natural Area and Kennedy Coulee Ecological Reserve are contained within a major physiographic division of Canada known as the Interior Plains (Pettapiece 1986). This is subdivided further into the Western Alberta Plains Region, the Southwest Plains Section and finally the Lost River Plain District.

Topography of the area changes from undulating and gently rolling plateaus in the eastern portion to rolling and hilly in the central and western portion progressing to the rough and eroded badlands of the Milk River valley. High points of land are scattered throughout the area, offering commanding vistas of the region. The presence of the Sweetgrass Hills, just southwest of the plan area, heighten the visual impact as they rise abruptly from the plains to an elevation of almost 2134 m (7000 ft.).

The uplands are sloped away from a dissected ridge, which runs southwest to northeast through this area. This is a part of the preglacial drainage that ran from the Sweetgrass Hills to the Cypress Hills. Elevations drop from 1097 m (3600 ft.) near the Sweetgrass Hills to 823 m (2700 ft.) along the floor of the Milk River valley. Upland elevations away from the ridge tend to be around 914 m (3000 ft.).

Ultimately, most of this area drains into the Mississippi-Missouri River system through Kennedy Creek, the Milk River and associated seasonal drainage channels. Before flows were augmented by irrigation diversion water, the Milk River would occasionally dry up in late summer. Today, only the Milk River has a permanent water flow. Kennedy Creek is subject to periods without flow, especially in dry years -- even though it is fed by numerous springs.

There are a number of seasonal ponds but many of these dry up relatively early in the summer. The only fairly permanent, natural water body is an oxbow in the southeast corner of the Natural Area. In addition, man-made structures, such as dugouts in the northwest and southeast corner and an earthfill dam, were constructed primarily for livestock-watering purposes.

2.2.3 Surficial Geology

Many forces have combined to create various landforms in the study area. Generally, the bulk of the area is a rolling to undulating till plain, which is dissected by the Milk River, Kennedy Creek and their associated drainage channels. In preglacial times, the Milk River flowed north along a drainage channel that extended from the Cypress Hills to the Sweetgrass Hills. Glaciers from the north eventually blocked off this flow, with the result that water now drains south into the Missouri

drainage basin. The resulting canyon is the deepest and possibly the most spectacular on the southern Canadian plains.

The remainder of the landscape, however, has not been drastically altered by glaciation since the area is in close proximity to the edge of the maximum advance of the Laurentide ice sheet. Consequently, ice thicknesses were relatively small, as was the amount of glacial modification. The thickness of glacial drift in the region is nearly always less than 15 m (50 ft.) and is sometimes absent (Westgate 1968).

The primary forces shaping the current landforms in the area were glaciofluvial in nature. The majority of the upland area can be described as an eroded plain scoured by meltwater. Flutings and moraines combine to create a pattern of low, parallel ridges and depressions composed of till or bedrock oriented in the direction of ice movement. The relief is only a couple of metres, but the length of features is sometimes more than 1.6 km (1 mi.) (Broscoe 1965).

The stream valleys owe much of their present appearance to postglacial erosion. Ephemeral streams erode down the side walls of the canyon, thereby extending the badlands and coulees. Most of these streams are short but drop as much as 152 m (500 ft.) in 3.2 km (2 mi.). The badland morphology is controlled by the bedrock composition which, in this case, has permitted the formation of deep narrow gorges with slopes as steep as 30 degrees or more. Rounded formations are found in newly forming badlands where relief is not quite as steep and the bedrock is more resistant to erosion. Unlike the rounded badlands found along the Red Deer River at Dinosaur Provincial Park, these badlands are deeply incised with angular shapings.

The streams that create the badlands and coulees subsequently deposit the eroded bedrock material in alluvial fans, where they flow into the canyon. The fans merge to form continuous deposits, which restrict the Milk River itself to the centre of the canyon. The Milk River proper meanders on an alluvial plain undercutting these fans in some areas and cutting into bedrock in other areas. The associated meander scars and oxbow lakes are of considerable ecological importance.

2.2.4 Soils

The Milk River Natural Area and the Kennedy Coulee Ecological Reserve lie within the brown soil zone. As with other features of this area, there is substantial diversity in the soil types, which vary from eroded bedrock with no soil profile to Solonetzic and Solodized Solonetzic soils exhibiting structural limitations within the profile to the more productive Orthic Brown Chernozemic soils with deeper horizon development (Wyatt et al. 1941). In addition, Gleysolic soils occupy low-lying areas of poor drainage.

The distribution of these soils across the landscape is a function of bedrock chemistry and the thickness of the overlying material. Chernozemic soils are found where the bedrock is non-saline. When the bedrock is saline and covered by only a thin layer of unconsolidated material, the soils are usually Solonetzic. As well, Solonetzic soils develop on the lower slopes and bases of bedrock ridges, which receive subsurface groundwater discharge (Brierley et al. 1989).

Solonetzic soils are associated with undulating to level, but pitted "blowout" terrain. These "blowouts" are slowly revegetating scars resulting from water and wind surface erosion. Such soils are quite impervious to water infiltration with the result that even light precipitation gives rise to surface ponds and runoff. Chernozemic soils, on the other hand, are found in a broad range of landscape positions, but lack the blowout microtopography (Brierley et al. 1989).

All soils have developed under low rainfall and the surface horizons are low in organic matter. The lime layer is usually encountered 15 cm to 36 cm (6 to 14 in.) below the surface.

Soil textures range from fine sandy loam in the northwest to loam and clay loam in the southeast. Light loams are found in pockets between the fine sandy loams and the loams in the Kennedy Creek drainage. The remainder of the area consists of exposed bedrock and the mixed alluvial soils deposited on the flood plains of the stream valleys.

Stoniness is highly variable throughout the area. Some portions have only a few stones on the surface while in other places whole hillsides are covered with rocks of various sizes (Public Lands Division 1979).

2.2.5 Bedrock Geology

The Milk River Natural Area and the Kennedy Creek Ecological Reserve are underlain by two Upper Cretaceous bedrock formations, the Foremost and the Oldman, both of which are exposed along the canyon.

The Foremost Formation has a composition that varies from sandstone in the upper portions to predominantly shales in the lower part. Some materials include grey shales, sandy shales, carbonaceous shales, clayey and hard sandstones, ironstone and coal seams. The colouration is generally pale but varies from grey to reddish to yellowish. Fine bands of various colours are very common.

The Oldman Formation lies above the Foremost. Its beds are well exposed, forming extensive badlands along the Milk River valley. It is composed of light coloured sandstones and shales with the latter being predominant. Colours vary from pale grey to dark brown. It includes the Comrey sandstones which can form hoodoos and concretions. Both of these features are represented on the plan area.

An intrusive igneous dike is found near the rim of the canyon in the southeast corner of the Natural Area (Wallis 1976). These features are rare in southern Alberta occurring only in the Milk River Area (Wallis 1976).

2.2.6 Paleontology

As described in the previous section, the presence of numerous exposed bedrock formations make this area of considerable paleontological interest. These formations have been influenced by the progression in nature of overlying waters, i.e., from marine to brackish water to freshwater and terrestrial environments. The Oldman Formation, in particular, is most famous for its rich vertebrate fauna, one of the largest assemblies of the kind in the world (Crockford and Clow 1965). Significant finds have been made in neighbouring areas in the Oldman Formation. There is a wealth of fossils ranging from molluscs to land vertebrates.

Little research has been carried out in the more accessible badlands, so it is conceivable that there is more diversity than is presently known. The first reports of dinosaur fossils in Alberta came from the Milk River valley (Dawson 1875).

2.2.7 Archeology

"It is likely that the area has been intermittently occupied by Native Americans since the end of the last Ice Age some 12,000 years ago. The reported discovery of a lanceolate projectile point base (possibly an Agate Basin style spear point used between 11,000 and 9,000 years ago) within the Milk River Natural Area may indicate the early occupation of the area. Pelican Lake (3,300 to 2,000 years ago) and Besant 2,000 to 1,150 years ago) style projectile points have also been casually recorded in the area. Although detailed surveys have not been undertaken, tipi rings sites have been recorded on the uplands, while buried campsites occur within the valleys alongside Kennebec Creek and the Milk River. At least one bison kill site is also known. A Native burial was recovered from the Milk River valley about 30 years ago. It is apparent that the ecological and topographic diversity of the region attracted Native occupation at times throughout the last 12,000 years." (J. Ives, Assistant Director, Archeology and Ethnology, Alberta Culture and Multiculturalism, memorandum to Philip Stepney, Director, Provincial Museum of Alberta, January 16, 1992.)

2.2.8 Vegetation and Flora

The vegetation covering any given area depends on a wide variety of factors including soils, topography, aspect and moisture. In addition, many plant communities intergrade with others because of the rapid vegetational changes created by a diverse landscape. Consequently, since the Milk River Natural Area and Kennedy Coulee Ecological Reserve contain some of the most diverse landscapes in the province, the plant communities associated with these landscapes also vary widely.

The following discussion briefly summarizes the vegetation within the two areas, outlines the various habitats and predominant species, and highlights some of the rare plants found. More complete and detailed descriptions are contained in supporting documents by Wallis (Wallis 1976, 1989).

The Mixed Grassland as described by Coupland (1950) is a widespread vegetation type in North America but a great deal of this natural region has been converted to cropland and other land uses. There has been very little modification of habitats in the Natural Area and Ecological Reserve and there is a high proportion of native species.

The rolling terrain encompasses a variety of Mixed Grassland habitats ranging from dry and lush grasslands to ephemeral wetlands, alkali flats, springs, sandy soils, rocky knolls, badlands and moist meadows along stream valleys. Communities associated with the Milk River Canyon vary from extensive badlands devoid of any vegetation to sparsely vegetated alluvial fans and sagebrush flats, and to riverine woodlands and aquatic habitats (Wallis 1976).

Grasslands of the area are mostly of the Stipa-Bouteloua type with needle and thread and blue grama being the dominant species. The best development of this occurs on Orthic Brown Chernozemic soils. Secondary grasses include northern wheat grass, western wheat grass, June grass, Sandberg bluegrass and sedges. Occasionally, sagebrush becomes an important constituent and the major forbs include moss phlox and prairie selaginella (Wallis 1976).

There is a marked change in the composition of the grassland as moisture becomes more limiting. This moisture deficiency can be caused by physical factors (exposed coulee edges, for example) or from influences such as increased grazing pressure. There tends to be less growth of medium-sized

grasses and increasing abundance of shorter vegetation notably blue grama, Sandberg bluegrass, prairie selaginella, moss phlox, broad-leaved everlasting and pasture sagewort.

In moist depressions within this grassland type, radical changes occur with variation from one depression to the next. Some areas are vegetated with a dense stand of green needle grass while others may be dominated by fairly pure stands of death camas or a mixture of forbs. In addition, grasses like California oat grass and bluegrasses may be reasonably common.

Almost all sandy soils, including moist coulee slopes, are dominated by sand grass. Other species that occur widely on sandy soils include golden bean and white and purple prairie-clovers.

The dominant grass on Solonchak soils tends to be western wheat grass with secondary grasses being blue grama and mat muhly. Sedges are also present. Nearly pure stands of western wheat grass can be found on some old slough bottoms where the soil is finer textured and slightly alkaline.

Edges where coulees and grasslands meet are complex communities in which vegetation seems to be highly pocketed and variable. These sites plus eroded slopes and sandstone outcrops are characteristically dominated by plants adapted to harsh environments. Vegetation is often sparse on these sites and can vary from moss and lichens on the sandstone outcrops to deep-rooted shrubs, like greasewood, rabbitbrush, long-leaved sage, sagebrush, povertyweed, Nuttall's atriplex and silver saltbush, on actively eroding sites.

Woodland communities are of two types: those located on sheltered coulee slopes and those found in stream valleys on floodplain soils characterized by immature profiles. Coulee woodlands occur only along areas of Comrey sandstone where soil moisture conditions are most favourable. They are dominated by aspen and hybrid poplars that are generally small in size. Riverine woodlands are a complex patchwork of cottonwood stands intermixed with grass-sagebrush openings and tall shrubbery such as thorny buffaloberry and yellow willow (Wallis 1976).

The understory species common to both woodlands include water birch, saskatoon, choke cherry and red-osier dogwood combined with a dense growth of common wild rose, buckbrush and some northern gooseberry. In addition to these shrubs, there is a wide variety of forbs, grasses, mosses and lichens that only grow in woodland communities. Consequently, these are not plentiful in this portion of the Mixed Grassland.

Aquatic and semi-aquatic habitat is quite diverse and includes not only permanent water bodies, such as oxbow lakes and a man-made reservoir, but also wet meadows of stream valleys, springs, mudflats, ephemeral sandy wetlands and snowmelt areas. Plants most frequently encountered in permanent water bodies are common cattail, common great bulrush, arrow-leaved arrowhead, sedges, spiked water-milfoil, large-leaved watercrowfoot and smartweeds. In addition to these species, many of the 18 provincially rare plants found in the Milk River Natural Area (Wallis 1989; Natural and Protected Areas files) are associated with these moist sites. The number of provincially rare plants found in the Ecological Reserve is unknown at this time. However, given the similarity in habitats to the Milk River Natural Area, it is anticipated that there could be several such species.

As defined by Packer and Bradley (1984), the rare plants found in the Natural Area include one-spoke oat grass, scratch grass, American pellitory, nodding umbrella-plant, Watson's knotweed, sea-blite, mousetail, slender cress, Pursh's milk vetch, smooth boisduvalia, upland evening primrose, cushion everlasting, hawk's-beard, dwarf fleabane, small-flowered hawk's-beard, woollyheads and prairie false dandelion. In Alberta, most of these rare plants are restricted to the southeastern corner of the province.

2.2.9 Fauna

The fauna of the area also exhibits diversity. Five types of habitats were identified by Wallis (Wallis 1976), who presented a more complete faunal analysis than is included in the following faunal summaries.

The aquatic habitats include rivers, streams and freshwater pools, seepage areas or springs, oxbow ponds and adjacent edge habitats. The fairly permanent water bodies are home to many species of insects, fish, amphibians, birds and mammals, such as beaver and muskrat. The rare western painted turtle has been recorded in the oxbow pond in the southeast corner of the Natural Area (Olson 1976).

The shrublands range from sage brush flats to tall willow-thorny buffaloberry vegetation and each community is quite distinct with regards to the faunal inhabitants. Sagebrush flats are occupied by the western meadowlark, Brewer's and vesper sparrows, mule deer and, in some winters, pronghorn antelope. Wood ticks are most common here. The taller shrubland types attract birds like the black-billed magpie, cedar waxwing, American goldfinch, brown thrasher, gray catbird, rufous-sided towhee and yellow warbler. The loggerhead shrike, yellow-breasted chat and the lazuli bunting are restricted to tall riverine shrubbery. The Viceroy and Weidemeyer's admiral butterflies frequent shrublands in the vicinity of seepage areas.

The woodland habitat in the Milk River supports a diverse and dense faunal population. Porcupines, Nuttall's cottontail, elk and white-tailed deer occupy this habitat, as do birds such as the black-billed cuckoo, northern flicker, downy woodpecker, house wren, ring-necked pheasant and the rare black-headed grosbeak.

Many types of wildlife are found in the badlands, eroding slopes and bedrock exposures adjacent to coulees where they nest in or occupy the numerous rock cavities. Of particular interest are the important birds of prey such as the golden eagle, ferruginous hawk, prairie falcon and great horned owl. In addition, bull snakes, prairie rattlesnakes, short-horned lizards, bushy-tailed woodrats, bobcats and scorpions live in the badlands habitat.

The fifth habitat in this region, the grasslands, is frequented by large numbers of birds but by only a few species. These species include, but are not limited to, Swainson's hawk, western meadowlark, sharp-tailed grouse, Baird's sparrow and McCown's longspur. Pronghorn antelope and mule deer are the only large mammals favouring the grasslands, while deer mice, Nuttall's cottontail and meadow and sagebrush voles are the predominant small mammals.

Many of the rare and significant fauna have already been discussed above. Those species found only in this location in Canada are the following: crested grasshopper, white cross grasshopper, small checkered skipper, Weidemeyer's admiral butterfly, and the yucca moth. There are several other species of insects that are found nowhere else in Alberta (Wallis 1976).

The silvery minnow and stonecat are two fish species that are scarce in Alberta and inhabit this region. The rare western painted turtle exists naturally in the canyon as do some rare reptiles such as the short-horned lizard and the western hog-nosed snake. A number of uncommon/rare birds are found here including the golden eagle, ferruginous hawk, the prairie falcon and the black-headed grosbeak. Baird's sparrow and ferruginous hawk have been designated as "threatened" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

2.2.10 Aesthetics

Scenic resources of the Milk River Area have been inventoried and discussed by Olson (1976). From a wildland standpoint, the two major positive characteristics of the landscape appear to be the natural diversity within a relatively small area and the panoramic views. The steep rugged badlands in contrast with the lush river bottom, and the surrounding grasslands in combination with the striking long distance panoramas, together distinguish the Milk River Natural Area from other river badlands like Writing-on-Stone and Dinosaur Provincial Parks (Olson 1976).

The Sweetgrass Hills constitute the main focal point from all grassland areas at Milk River, although there are obscure vistas of the Bearpaw Mountains to the southeast and the Cypress Hills to the northeast. Both the grasslands and the river valley provide seasonally changing colours, which are broken only by the badlands and bedrock exposures (Wallis 1976).

Much of the aesthetic value of the Milk River Natural Area and Kennedy Coulee Ecological Reserve is a consequence of their remote location and of the responsible stewardship practiced by previous ranchers. Apart from the rare occurrence, this area has remained relatively ungrazed over the last two decades. In addition, the Natural Area and Ecological Reserve are surrounded by extensive grazing lands further enhancing the aesthetic character of the area.

2.3 Land Uses

2.3.1 Historical

"Although little detailed research has been conducted, it is likely that the area has been occupied intermittently for about 12,000 years by Native Americans. Tipi rings scattered on the prairie uplands indicate brief camping episodes by Native peoples hunting in the region; these sites were likely occupied during the warm months. Most often, the landscape was probably used by small extended family groups stalking buffalo for daily sustenance along the eroded valley rims. Larger kills, conducted in spring or fall by bands of several hundred people might also be present. At least one site on Kennedy Coulee would seem to be a potential candidate for such landuse. Although access to the Milk River valley likely was difficult, there remains the possibility that the wooded terraces attracted winter occupation. Buried campsite material has been reported from the upper terraces of the Milk River valley. Of course, associated activities such as the extraction of lithic raw material for tool making, food and medicinal plant collecting, burial of the dead, vision questing, rock art production, and so forth may have taken place, and some of these activities will have left their mark on the landscape." (J. Ives, Assistant Director, Archeology and Ethnology, Alberta Culture and Multiculturalism, memorandum to Philip Stepney, Director, Provincial Museum of Alberta. January 16, 1992.)

The first recorded Europeans to visit the region were Lewis and Clark who travelled it in 1805 as part of an exploration venture. The next major European journey to the area was in 1853, when Issac and Stevens passed through the area while searching for a suitable route for the railroad. Shortly thereafter in 1855, another American, James Doty, ventured into the area as an emissary of the American government in an attempt to arrange a treaty with the Indians. Palliser, on his expedition that followed in 1863, closely approached the canyon but never saw it. Fur traders and bison hunters

also travelled the area during this time, causing the eventual demise of the bison, the plains wolf, the kit fox and the plains grizzly bear.

More rapid changes began to occur in this period. Around 1869, whiskey traders established operations in the region and profited from the sale of liquor to Natives. The area became the hideout for fugitives. This invasion of American undesirables, plus the liquor-related slaughter of a group of Natives, combined to promote the advent of the Northwest Mounted Police in 1874. The police had the mandate of not only protecting Natives and settlers from American lawbreakers, but also controlling fires and cattle-smuggling operations (Johnson 1984).

Treaty 7 was signed in 1877, after which the Natives relinquished the land and moved onto reserves. This was followed in 1887 by a major influx of Mormons from the United States into the Milk River region. The period from about 1875 to 1920 was characterized by extensive ranching operations, which gradually replaced the activities of indigenous hunters. The area has remained primarily a ranching community to this date.

2.3.2 History of Ranching

Historical information, related to the grazing dispositions issued in the Milk River Natural Area between 1920 and 1940, is sketchy. Additional information for the years before 1925 was supplied by Bill Brower whose family had ranched in the area since the early 1900s.

The Spencer brothers came to southeastern Alberta from Teton, Montana in the late 1890s and ranched the area now included in the Natural Area, the Pinhorn Provincial Grazing Reserve and a large portion of land east of the Natural Area. The eastern part of their operation was called the Lower Spencer and the western part, the Upper Spencer.

In 1917, J. H. Wallace and Walter Ross acquired the entire area from the Spencer brothers. Around 1924, Wallace and Ross dissolved their partnership. Mack Higdon and Co. bought the Upper Spencer and the Gilchrist brothers bought the Lower Spencer.

Numerous leases that were held by the Higdon Co. were amalgamated in 1940 under three leases. Parts of these leases were reassigned to Nellie A. Bower and to Henry Finstad in 1946 and 1948, respectively. The remainder of the Higdon leases were reassigned, also in 1948, to the Wertheimer Ranching Co., which changed its name to Bar-N-Bar Ranch.

Around the same time, the Gilchrist brothers assigned their leases to Bar X Ranches. In 1950, the majority of Bar X Ranches was assigned to Lost River Ranches controlled by the late George Ross. Beginning in 1958, 90 sections were removed from Lost River Ranches for community pastures. As partial compensation for this loss, lands that now comprise the Milk River Natural Area and the Kennedy Coulee Ecological Reserve were transferred from Bar-N-Bar Ranches to Lost River Ranches.

At that point, the Lost River Ranch was the largest lease in Alberta, consisting of 58 308 ha. (144 077 ac.). The lands south and west of the Milk River were separated from the main part of the ranching operation and were reportedly grazed infrequently. In accordance with the Public Lands Act, which limited the acreage of a lease to that which would support 600 head of cattle annually, about 40 470 ha. (100 000 ac.) were deleted in 1978 and 1979 from Lost River Ranches. Part of this land was used to establish the Sage Creek Grazing Reserve, some was allocated to the One Four Research Station and the remainder was used for the establishment of the Milk River Natural Area and the Kennedy Coulee Ecological Reserve (Lanz and Kusler 1980).

Despite the gradual encroachment of cultivation surrounding this region, the major land use has been ranching. In addition, the Natural Area and Ecological Reserve have remained relatively ungrazed over the last two decades.

2.3.3 Minerals

Petroleum and natural gas exploration over the years has resulted in five wells being drilled and abandoned within the boundary of the Natural Area. There are no established hydrocarbon reserves although the Sawtooth and Belly River Formations offer some potential for oil and gas. Oil was encountered in a well drilled in 7-1-5-W4 in 1964 but was abandoned without production. The only mineral agreement in the Natural Area is a 5 year Petroleum and Natural Gas Lease issued in 1989. The lease in 6-1-5-W4 was issued under condition that surface access will not be allowed. No wells have been drilled in the Ecological Reserve.

There are Freehold Mineral Rights in NW, S 26-1-6-W4.

Other mineral activity in the area included some coal mining along the sides of coulees where coal seams were visible in the bedrock. This activity was abandoned as being economically unfeasible.

2.3.4 Recreation

Recreational activities include hunting, camping, canoeing, bird and wildlife viewing, and paleontological exploration, all of which are limited by the remoteness of this area. These uses are expected to increase as increases in our society's leisure time, in society's demand for more diverse recreational pursuits and in our knowledge of the area. Local initiatives to attract tourists to the general area include the Etzikom Museum, circle tours based out of Calgary and canoe trips down the Milk River promoted by the Milk River Canoe Club.

An increase in the level of these and other recreational pursuits could result in extensive damage from things such as random vehicular traffic and unattended campfires. Such damage will take a long time to recover because of the region's combination of climatic and edaphic factors.

2.4 Special Features Summary

The importance of this area cannot be attributed to any single factor. Instead, a unique combination of cultural and natural factors generates the area's significant values. Other places in Alberta may exemplify some of the features found here, but no place has the complete spectrum of resources that characterize the Milk River Canyon. In addition, it has numerous resources which are not encountered elsewhere in Alberta and some are not encountered in Canada. Examples of special features found on the site include the following:

- a wide diversity of habitats within a relatively small area;
- Milk River Canyon, which is the deepest in the western Canadian Plains;

- igneous rock exposure -- only seven such exposures occur in the grasslands of western Canada;
- extensive badlands with rare associated features such as crystalline boulders, concretions and massive exposure of Comrey sandstone;
- fossils;
- archeological sites in the context of their original landscape such as tipi rings, rock cairns and sites of vision quests, the last of which are uncommon in the province;
- nesting sites for birds of prey such as the golden eagle and prairie falcon;
- numerous plants that are rare or restricted in their distribution in Alberta and/or Canada such as red three-awn, rabbitbrush, butte marigold and sea-blite;
- Weidemeyer's admiral butterfly known in Canada only from the Milk River area;
- numerous animals that are rare or restricted in their distribution in Alberta and/or Canada such as western painted turtle, short-horned lizard, western hognose snake, black-headed grosbeak and bobcat;
- some of the most spectacular panoramic views in the Canadian Plains; and,
- wildland character with its vastness and lack of man-made intrusions.

Landscape features for the Natural Area and Ecological Reserve are mapped (Figure 3).

Figure 3.

MILK RIVER NATURAL AREA
AND
KENNEDY COULEE ECOLOGICAL RESERVE
LANDSCAPE FEATURES
(Compiled from: Wells (in d.: 1989); Barley et al. 1989)

Scale 1:50 000
WEST FOURTH MERIDIAN

LEGEND

- Natural Area Boundary
- - - Ecological Reserve Boundary
- - - Recommended Route
- Fence Lines
- Dugouts
- Seismic Line or Trail
- Contour Interval 50 Metres

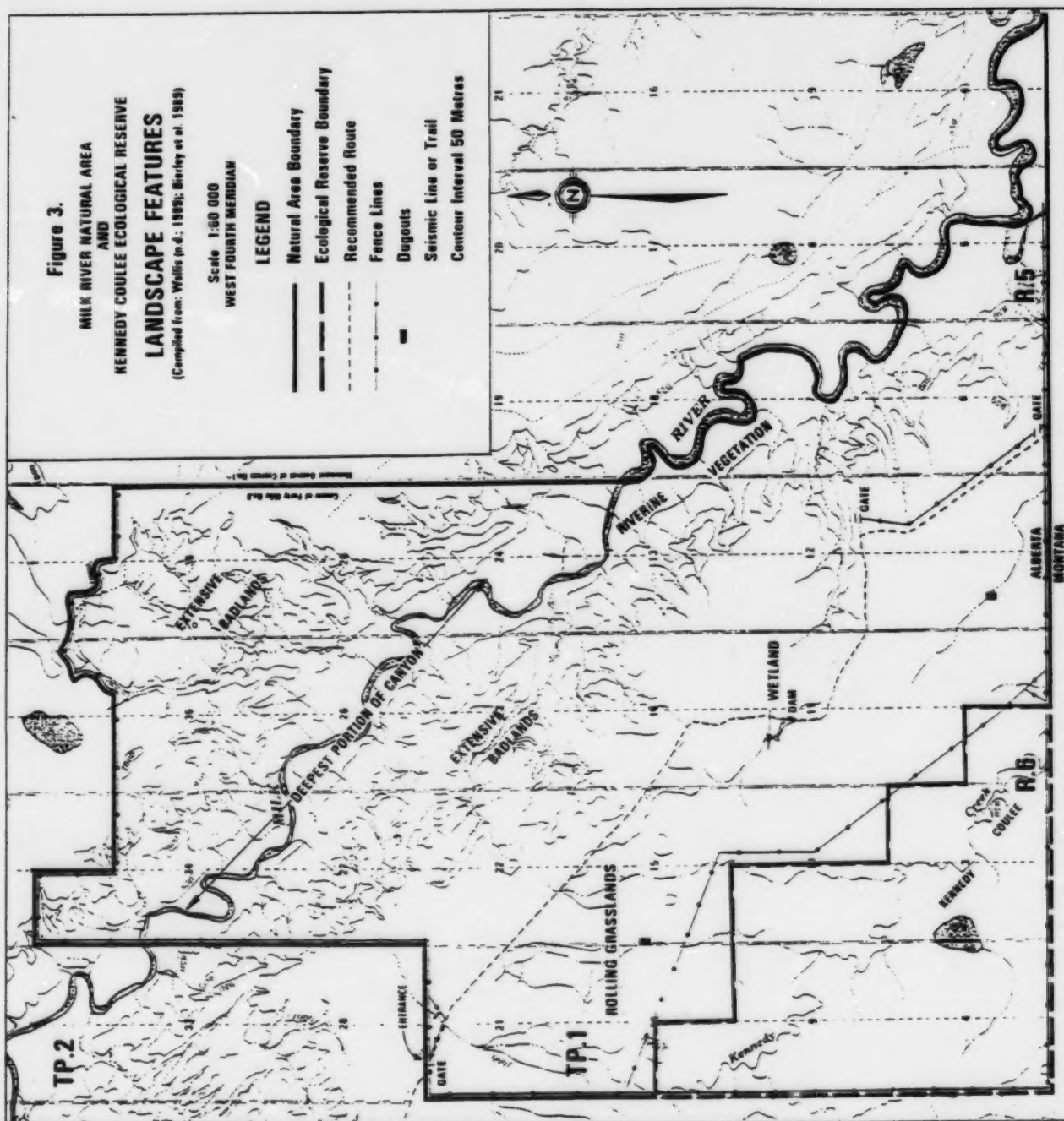


Figure 5. Management Activity Approval Process

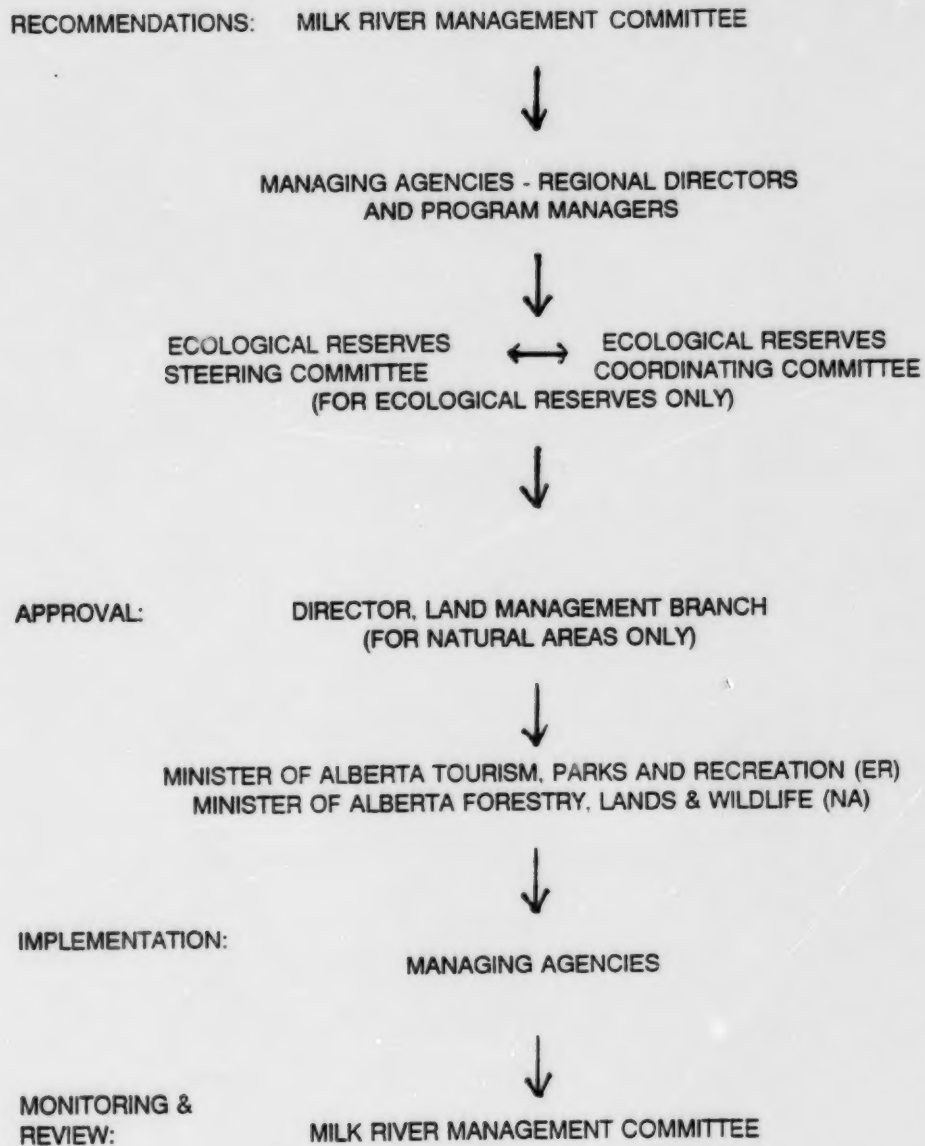


Table 2. Management Issues and Strategies.

MANAGEMENT ISSUES	MANAGEMENT STRATEGIES KENNEDY COULEE ECOLOGICAL RESERVE	MANAGEMENT STRATEGIES MILK RIVER NATURAL AREA
Fire	- prescribed burning permissible for management purposes, but not recommended at this time - no open fires - preparation of fire management plan before implementation of prescribed burn - recommend preparation of fire management plan to address suppression of wildfires - suppression of wildfires	- prescribed burning permissible for management purposes, but not recommended at this time - campfires discouraged - preparation of fire management plan before implementation of prescribed burn - recommend preparation of fire management plan to address suppression of wildfires - suppression of wildfires
Habitat Manipulation	no habitat manipulation unless required for management purposes	no habitat manipulation unless required for management purposes. Adequate controls and monitoring protocols will be in place before implementation of such a program.
Species Manipulation	no manipulation of species unless required for management purposes	no manipulation of species unless required for management purposes. Adequate controls and monitoring protocols will be in place before implementation of such a program.
Native Species Reintroduction	reintroduction of indigenous species encouraged provided that other rare, threatened or significant species or their habitats are not adversely affected	reintroduction of indigenous species encouraged provided that other rare, threatened or significant species or their habitats are not adversely affected
Exotic Species/Pest/Disease Control	- suppression of exotic species/pests and diseases may occur as required to protect features of the site and to protect private interests outside the site - chemical controls to be used if mechanical means of suppression are unsuccessful. Restricted weeds will be destroyed, noxious and nuisance weeds will be controlled.	- suppression of exotic species/pests and diseases may occur as required to protect features of the site and to protect private interests outside the site - chemical controls to be used if mechanical means of suppression are unsuccessful. Restricted weeds will be destroyed, noxious and nuisance weeds will be controlled.
Reclamation	- natural regeneration - restricted to species indigenous to the site	- natural regeneration - restricted to species indigenous to the site

MANAGEMENT ISSUES	MANAGEMENT STRATEGIES KENNEDY COULEE ECOLOGICAL RESERVE	MANAGEMENT STRATEGIES MILK RIVER NATURAL AREA
Fencing	- all fencing kept to a minimum	- all fencing kept to a minimum - one fence separates the Natural Area from Kennedy Coulee and small fences have been placed at the heads of two coulees - fence locations and need for additional fencing to be reviewed by the Milk River Management Committee
Facilities	- no facilities	- none planned
Monitoring	- done in conjunction with Natural Area	- responsibility of Milk River Management Committee, primarily Public Lands Division and/or their designate -- long-term vegetation and wildlife plots to be established before initiation of grazing and revisited annually
Communications	- general site brochure will be developed jointly for both Natural Area and Ecological Reserve - information sign at entrance to Natural Area	- general site brochure will be developed jointly for both Natural Area and Ecological Reserve - information sign at entrance to Natural Area
Administration	- management advice provided by the Milk River Management Committee and the Ecological Reserves Coordinating Committee	- management advice provided by the Milk River Management Committee

MANAGEMENT ISSUES	MANAGEMENT STRATEGIES KENNEDY COULEE ECOLOGICAL RESERVE	MANAGEMENT STRATEGIES MILK RIVER NATURAL AREA
Education and Research	- educational use allowed but not promoted - nondestructive research permitted - collections require permit authorized by the Minister of Tourism, Parks and Recreation, in some cases a permit from Fish and Wildlife, and for archeological and paleontological resources the Minister of Culture and Multiculturalism - zero-impact camping permitted but not encouraged - no hunting unless required for management purposes	- educational use allowed but not promoted - nondestructive research permitted - collections require permit authorized by the Minister of Tourism, Parks and Recreation, in some cases a permit from Fish and Wildlife, and for archeological and paleontological resources the Minister of Culture and Multiculturalism - zero-impact camping permitted but not encouraged
Camping		
Hunting		
Motorized Vehicles	- prohibited except in emergencies and for management and research activities	- permitted - administered by Fish and Wildlife Division - on recommended routes, off trail use monitored - no vehicular access west of the trail except for emergencies and management/research activities, including grazing management
Grazing	- no grazing unless required for research and/or management purposes - consideration will be given to the sensitivity of springs and seepage areas within Kennedy Coulee - no development at present time - placement of water sources to be determined by management committee - no exploration or extraction	- grazing for management purposes only - grazing in upland portion done ideally under long-term contract or, in lieu of such, by annual tender - grazing in valley to continue by Lost River Ranches - no development at present time - need for additional water sources to be determined by management committee - no exploration or extraction except for area of freethold
Minerals and Aggregate		
Linear Development	- no new linear developments such as bladed or graded road development, pipelines or power lines	- no new linear developments such as bladed or graded road development, pipelines or power lines
Signs	- small boundary signs on fence encircling Ecological Reserve - information on sign at entrance to Natural Area	- one main sign at entrance to Natural Area plus small signs in right-of-ways at Black Butte turn off of Secondary Highway 880, at "Brower's corner", at Pinhorn corrals and north of the Pinhorn corrals, plus sign at terminus of recommended route, plus sign on river flats - gates signed "Please leave gates as found" - need for signs indicating foot access to the Ecological Reserve to be determined in the future

Table 3. Matrix Outlining Agency/Organization Responsibilities.

	Public Lands	Natural and Protected Areas	Fish & Wildlife	Prov.* Park Serv.	County of Forty Mile	Mgmt. Cmt.
suppress wildfires	C			C	A	
preparation of fire mgmt. plan for suppression of wildfires	C	C		A	A	C
habitat manipulation	C	A	A	A		C
species manipulation	C	A	A	A		C
native species re- introduction	C	A	A	A		C
reclamation	A	C	C	A		C
educational use (permits)	C	A	A	A		
research use (permits)	C	A	A	A		C
trail location & amendments	C	C				A
signage	A	A		A	C	C
grazing - implementation & mgmt.	A	A		A		C
fencing	A	A		A		C
monitoring use	A			C		A
monitoring long-term plots	A	A	C	A		C
communications		A		A		C
off-highway vehicle use (monitoring)	A		A	C		A
hunting			A	A		C
camping (monitoring)	A			C		A
exotic species/pest control		C		A	A	C

A - approval - refers to main agencies. The number of agencies required for approval may depend on the activity and where it is to take place.

C - consultative

* Ecological Reserve only

Fire Management Guidelines

1. A fire management plan must be prepared, to address the suppression of wildfires. This plan will include a discussion of prevention, detection, suppression and post-fire rehabilitation. In addition to the approvals outlined in Section 3.6, the fire management plan is to be approved by the County of Forty Mile.
2. Suppression of all wildfires is required. This is currently under the mandate of the County of Forty Mile.
3. Use of portable camp stoves for cooking is permitted. Campfires will be discouraged in the Natural Area and not allowed in the Ecological Reserve.
4. Prescribed burning (deliberate fire set for habitat management purposes) is not being considered for the management of these grasslands at this time. Consideration may be given, in future, to such use of fire. This would be done only after a detailed fire management plan had been reviewed and endorsed by the Milk River Management Committee and the local public.

The following steps should be considered in the preparation of fire management plans for Natural Areas and ecological reserves (Bradley 1984):

1. Collect background information including a determination of fire history, a review of literature on fire effects, and a compilation and review of information on fuel types, climatic and meteorological characteristics, terrain features, potential fire behaviour and constraints;
2. Develop fire management objectives for the area and identify implementation strategies;
3. Consult with other agencies to discuss techniques, jurisdictional responsibilities and constraints. Individuals and/or agencies contacted should be knowledgeable in grassland ecology and fire management. These may include representatives of the Fish and Wildlife Division, Public Lands Division, Alberta Forest Service, Canadian Forestry Service, Department of National Defence, Parks Canada, United States Forest Service, and United States Parks Service; and
4. Develop and implement public education programs on fire management.

It is recommended that study plots be established in burned areas to monitor responses of communities and species to fire.

3.1.3 Habitat Manipulation

As plant communities mature and change, some populations of plants or animals may be reduced or eliminated because of changes in habitat suitability. If habitat that is needed for rare, threatened or endangered species is reduced, limited habitat manipulation may be undertaken after consultation with the appropriate managing agencies, i.e., Fish and Wildlife, Agriculture, etc. Adequate controls and monitoring procedures will be established before the implementation of such a program.

Habitat manipulation will be considered only if it has no negative impacts on threatened, rare or endangered species, or on fragile or limited natural communities and features.

3.1.4 Species Manipulation

In exceptional circumstances, if significant features of the Natural Area and/or Ecological Reserve are threatened or if adjacent land, resources or facilities are jeopardized, it may be necessary to implement a management program for specific plant and/or animal species. If such a measure is required, it will be directed by the appropriate managing agencies, i.e., Fish and Wildlife, Agriculture, etc. Adequate controls and monitoring procedures will be established before the implementation of such a program.

3.1.5 Native Species Reintroduction

The reintroduction of native species that once occupied the area will be encouraged in both the Natural Area and the Ecological Reserve providing the introduction will not lead to the demise of other rare, threatened or significant species or their habitats. In addition, this management activity must not lead to any physical damage to the area and must comply with other guidelines stated in this plan such as access, fire and camping.

Such species reintroduction will be done in consultation with the Fish and Wildlife Division.

3.1.6 Exotic Species/Pest Control

Several weeds, pests and diseases exist in Alberta and also in the neighbouring portion of the United States from which the Milk River originates. As the use of the plan area increases, so does the potential for the invasion of many weeds, pests and diseases.

Weeds

The control of weeds in Alberta is governed by the *Weed Control Act*, which takes precedence over the more recently proclaimed *Wilderness Areas, Ecological Reserves and Natural Areas Act* (WAERNA). In the plan area, the County of Forty Mile is responsible for the implementation of the *Weed Control Act*.

The *Weed Control Act* separates weeds into three categories - restricted, noxious and nuisance - which are based on the degree of control required. Restricted weeds must be destroyed, whereas noxious and nuisance weeds must be controlled. The County of Forty Mile lists nine weeds as restricted in the plan area (See Appendix 3).

If and/or when restricted weeds, as defined by the *Weed Control Act* and as designated by the County of Forty Mile, are found on either the Natural Area or the Ecological Reserve, control measures must be taken to eliminate the weeds found.

If possible, a common sense approach should be taken regarding the control of weeds. Small areas of infestation may be initially handled using selective control as a first option (i.e., hand picking). Mechanical and biological methods of control could be considered as a second alternative. Chemical means (i.e., pesticides) will be used as a last resort, depending on the size of the population and the degree of control required. Any application of chemicals must be done in accordance with existing legislation (i.e., *Agricultural Chemicals Act*), in consultation with the management committee and with the approval of the various regulatory authorities: Alberta Environment, Alberta Agriculture, Alberta Forestry, Lands and Wildlife, Alberta Tourism, Parks and Recreation, and the County of Forty Mile.

Maintaining the Mixed Grassland in good condition may be the best and most efficient means of controlling weeds in this area.

Other Exotic Species/Pests/Diseases

Control of all other exotic species, pests or diseases will be subject to the appropriate legislation. Approvals for such activities will follow the procedure outlined in Section 3.6.

3.1.7 Ground and Surface Water

With the Natural Area and Ecological Reserve being located within the driest area of the province, it is not surprising that many of the rare plant species are associated with areas such as ephemeral wetlands, moist coulees, springs, oxbow lakes and the river itself. Every attempt should be made to prevent any detrimental use of the majority of these areas.

3.1.8 Reclamation

Reclamation of any disturbed areas within the Natural Area or Ecological Reserve will be done with species native to the area and only after natural regeneration processes prove ineffective.

3.2 Education and Research

The Natural Area is by policy, a conservation Natural Area but has potential for education because of its diversity of plant communities and wide range of special features. For the following discussion of education and research, it is necessary to separate the management guidelines that differ for these sites.

Both Sites

- a) Although public use of the sites will be allowed for education, such use will not be promoted.
- b) Only foot and horseback access are permitted south and west of the recommended route specified in Figure 4.
- c) Nonconsumptive educational activities are permitted.
- d) Nondestructive scientific research for management purposes, for acquisition of knowledge about species associated with the Mixed Grasslands, or for general management of ecological reserves and Natural Areas will be encouraged. Other proposals for destructive or nondestructive research may be considered.
- e) A permit from the Fish and Wildlife Division is required to collect those species of wildlife as defined in the *Wildlife Act*. A permit from the Canadian Wildlife Service is required for those species covered under the *Migratory Birds Convention Act*. Archeological and palaeontological research and specimen collection require permits issued by the Minister of Culture and Multiculturalism.
- f) All research proposals must be reviewed by the management committee. The committee will forward its recommendations to those agencies responsible for permit issuance.

Natural Area

- a) Consumptive educational activities may be allowed after approval.
- b) Research activities involving destructive sampling, including collecting, will be considered.
- c) Facility construction (i.e., signage) will be kept to a minimum and will be authorized only for reasons of public safety and resource protection.
- d) Motorized vehicle access is encouraged only on recommended routes and only if conditions permit.

Ecological Reserve

- a) The collection, destruction or removal of any plant or animal life, or excavation or removal of fossils or other objects of geological, ethnological or historical origins is not allowed unless authorized by various authorities, as stipulated in the *Wilderness Areas, Ecological Reserves and Natural Areas Act*.

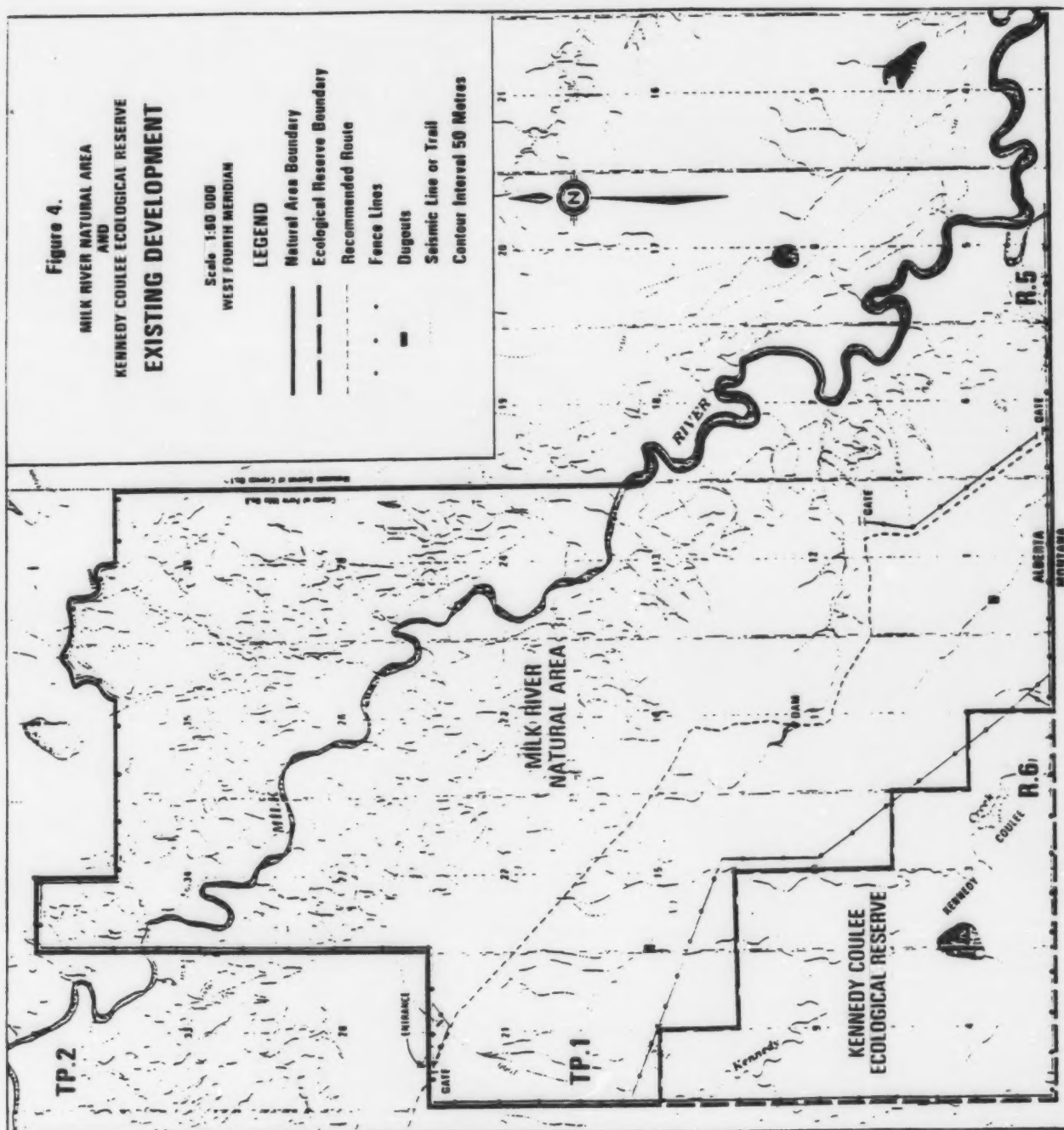
Figure 4.

**MILK RIVER NATURAL AREA
AND
KENNEDY COULEE ECOLOGICAL RESERVE
EXISTING DEVELOPMENT**

Scale 1:50 000
WEST FOURTH MERIDIAN

LEGEND

- Natural Area Boundary
- - - Ecological Reserve Boundary
- - - Recommended Route
- · · Fence Lines
- Dugouts
- Seismic Line or Trail
- Contour Interval 50 Metres



3.3 Access

Access into the area is limited primarily to one route on the south side of the river, which consists of graded gravel roads and ungraded dirt truck trails (see Figure 4). Since this access goes through several grazing leases, including the Pinhorn Provincial Grazing Reserve, the "use respect" policy is encouraged, whereby users are expected to leave all gates the same as found, restrict their vehicle traffic to recommended routes avoid harassing domestic livestock. This type of cooperative approach between lessees and the general public is the best way to ensure future access to public land.

Because of the remote location and the current state of access, it is of the utmost importance that users be aware of local weather conditions before entry. The potential for serious damage to these trails, not to mention the consequences of becoming stranded in a wilderness location, increases greatly if it rains.

3.3.1 Recommended Routes

Indiscriminate vehicle use has been shown to result in the following:

- damage to soil, watershed and vegetation;
- disruption of wildlife habitats and harassment of wildlife; and
- conflicts with persons using an area for natural history observation, or education and research (Nuxoll 1986; Public Lands Division 1987), and other uses such as hunting.

Unrestricted vehicle use by the general public in ecological reserves and Natural Areas by vehicles is incompatible with the purpose of these areas as stated in legislation. The management committee had to weigh the above consequences along with the need to provide access to popular areas and the primary goal of conservation. As a result, the management committee made the following decisions with regard to recommended routes for vehicles:

Natural Area

- a) The recommended route follows most of the existing trail system from the entrance to the Natural Area, across the dam and ending in the vicinity of the igneous dike (Figure 4).
- b) Drivers of motorized vehicles are encouraged to stay on the recommended route. No motorized vehicular access is permitted south and west of the recommended route or into the coulees, badlands and river bottoms and breaks. Motorized vehicular access east of the recommended route will be closely monitored.
- c) Nonmotorized forms of transportation are permitted in the Natural Area as long as the level of use remains relatively low. The site will be monitored by the Public Lands Division to determine level of use and degree of damage, if any, and to recommend corrective measures if/as needed.
- d) Exceptions to b) will be made under the following circumstances:
 - fire suppression:

- emergency situations where human health and safety are threatened;
- fence construction or repair; and
- management and research activities such as monitoring, placement of salt blocks and care of livestock with the approval of the management committee.

Ecological Reserve

- a) No recommended route is established for the Ecological Reserve.
- b) Nonmotorized forms of transportation are permitted in the Ecological Reserve. The site will be monitored by the Public Lands Division to determine level of use and degree of damage, if any, and to recommend corrective measures as needed.
- c) Motorized vehicles may be used in the case of emergencies and for certain management activities.

Since there are currently no serious problems related to access, the committee felt that minimal guidance is the most appropriate first step. The emphasis is on encouragement of courtesy and responsibility rather than regulation and enforcement. Additional measures will be adopted if monitoring reveals any problems regarding access. These measures could include additions to or the removal of portions of the recommended route.

3.3.2 Motorized Vehicle Use

Natural Area

Because of the large number of significant biological, physical and cultural resources and in keeping with the wilderness character of the site, motorized vehicle users are encouraged to stay on recommended routes and then only if conditions permit (see Section 3.3.1). Methods to control vehicle use such as fencing, signage, public education and/or regulation will be pursued by the Public Lands Division where necessary. Motorized vehicle use may be permitted in certain situations such as for fire suppression, when human life or safety may be threatened, for fence construction or repair, and management activities such as monitoring placement of salt blocks and movement and care of cattle. The use of horses or other nonmotorized forms of transportation is encouraged where practical.

Ecological Reserve

Motorized vehicle use is not permitted for the general public. The Minister of Tourism, Parks and Recreation or his designate may approve access by motorized vehicles under any of the following circumstances:

- a) the management and preservation of the animals, plants or environment;
- b) environmental research that does not involve physical disturbance;
- c) public education and interpretation; and
- d) preservation and protection of the reserve.

Enforcement to prevent unauthorized access into any ecological reserve is a problem under the current *Wilderness Areas, Ecological Reserves and Natural Areas Act* because of the lack of definition regarding the enforcing agency.

3.4 Recreation

3.4.1 Camping

In keeping with the wilderness character of the area, facilities will not be developed for camping in either the Natural Area or Ecological Reserve. Zero-impact (wilderness) camping will be permitted but not encouraged. All materials packed in must be taken out. Portable camp stoves should be used for cooking. Campfires will be discouraged in the Natural Area and will not be allowed in the Ecological Reserve.

3.4.2 Equestrian/Bicycle Use

Equestrian activities and bicycle use are acceptable forms of recreational activities for this area. Presently, the level of use is relatively low. The site will be monitored and corrective measures recommended as needed. Supplemental feeds for horses are not to be used because of the likelihood of spreading weeds.

3.4.3 Hunting

Natural Area

Hunting will continue to be allowed as administered by the Fish and Wildlife Division.

Vehicle access for hunters will be encouraged on recommended routes (see Section 3.3.1).

Ecological Reserve

Hunting is not permitted, as stipulated in the legislation, unless required for species management. At the present time, the RCMP are responsible for the enforcement of the pertinent section of the *Wilderness Areas, Ecological Reserves and Natural Areas Act*. Amendments to this legislation are being proposed that would transfer the relevant authority to other provincial officials such as Fish and Wildlife Officers.

3.5 Resource Extraction

For any resource-consuming activity, the onus is on the proponent of that activity to prove that no negative impact will occur, either on the resource values of the site or on the educational, research-oriented or recreational users.

3.5.1 Grazing

Grasslands have evolved as grazed systems. Historically the primary large herbivores using the prairie in this area were pronghorn and bison. Grazing habits of these large mammals resulted in a patchiness -- some areas were heavily grazed, others ungrazed and still others received a moderate amount of use. Several species of wildlife, including plants, are specialized to occupy those niches found in the grassland. Baird's sparrow, for example, requires areas of relatively tall grass with a large amount of litter. Other species, such as McCown's longspur, occupy sites of shorter grass such as heavily grazed sites.

Subsequent to the extirpation of bison from the plains, cattle were introduced into many places. Few, if any, areas of native grassland have remained ungrazed by domestic livestock. One special feature of the Milk River Natural Area and Kennedy Coulee Ecological Reserve is that they have been virtually ungrazed for the past twenty years. Therefore, these areas provide an "opportunity to develop a

grazing strategy which is more in harmony with the ecological character" (Public Lands Division 1984 p. 5).

Cattle do not entirely mimic bison in their grazing patterns but a grazing plan can be developed for these areas that provides the grassland structure required by the various components of the Mixed Grassland as an ecosystem (Public Lands Division 1984). Such a grazing strategy has been developed that aims to fulfill the preceding objective by promoting species and habitat diversity, as well as supporting the population growth of rare, endangered and/or significant species. Ungrazed to lightly grazed conditions will be provided in the Ecological Reserve and in parts of the Natural Area. Lightly to heavily grazed conditions will occur in the Natural Area. While the use of bison for grassland management is not considered to be feasible at this time, it could be considered in the future.

Natural Area -- Upland Portion

Grazing will be used as a management tool on the upland portion of the Natural Area to provide a variety of grazing intensities and thus different habitats. It will be done as prescribed by the Public Lands Division under the following conditions:

- a) the need for grazing will be reviewed on an annual basis and will be subject to the approval of the management committee in any given year;
- b) method of disposition -- the preferred method is a long-term contract that relies upon an annual evaluation of the need for grazing, before any subsequent permit is approved. If a long-term contractor with a strong commitment to conservation cannot be found, an annual tender can be issued. The management committee would be given the opportunity to review the specifics of the proposal such as period of grazing and class of animal;
- c) minimum bid acceptable -- to be set by Public Lands Division;
- d) initial carrying capacity -- 552 animal unit months (AUMs) or 138 cows at a standard weight of 454 kg (1000 lb.) grazing for four months [An AUM is the amount of forage required for one month by a mature cow weighing 454 kg (1000 lb.), either dry or with a calf up to six months of age. For every 45.4 kg (100 lb.) increase in live weight above 454 kg (1000 lb.), a total of 0.1 animal units is added to determine forage requirements.] The need for grazing and the appropriate AUMs will be determined by the management committee on an annual basis. The committee will work closely with the grazing contractor and will advise the contractor well in advance of any changes in AUMs;
- e) maximum season of use -- to be determined by the management committee (generally June to October);
- f) grazing system -- at this time, deferred grazing with delayed entry;
- g) water supply system that includes the following components: 1 dugout NE 16-1-6-W4M, 1 dam NW 11-1-6-W4M, and 1 dugout (not fully reliable) SW 1-1-6-W4M. At this time no further development is required. Should management activities dictate the need for additional water sources in the future the type and location will be determined by the management committee;
- h) salt blocks -- salt blocks will be placed away from water sources and their location will be changed frequently. Placement should avoid sensitive or significant features;
- i) fencing -- grazing permittee responsible for maintenance of the fence between the Ecological Reserve and Natural Area and for drift fences, while occupying the site, at all other times the Public Lands Division is responsible for fence maintenance;
- j) grazing contractor must supply information on breed, type and size of cattle and the registered brand;
- k) government will not be held responsible for lost cattle in the badlands area. Fences will be erected, by the government, at the heads of coulees that might possibly be used by cattle;

- l) cattle trailing -- the only feasible access is through the Pinhorn Provincial Grazing Reserve. therefore, permission must be obtained from the reserve supervisor before trucking or trailing of cattle. The grazing permittee will be responsible for provision of corrals;
- m) monitoring -- a long-term monitoring program(s) will be established before grazing is implemented and will then use annual site inspections both to guide management decisions regarding the need for grazing and to determine the effect of grazing on plant and animal communities and on rare species and their habitats. This work is to be carried out by consultants with expertise in grassland ecology, range management principles and rare species monitoring. If fires occur on site, plots should also be established in such areas to document responses of flora and fauna to fire. The proposed methodology, results and recommendations will be reviewed by the management committee. The information coming from these studies will be used by the management committee, in consultation with Public Lands Division, to guide future grazing strategies on the site. The monitoring program should be funded, in part, from proceeds of the grazing contract. The Natural and Protected Areas Section will supply some monies and other agencies will be encouraged to do the same; and
- n) motorized vehicles -- will not be permitted except for the purpose of salt-block placement, fence repair and other special circumstances related to grazing management. Horse use is encouraged, where practical.

Natural Area -- Valley Portion

Grazing in the Milk River valley portion of the Natural Area is permitted, as prescribed by the Public Lands Division under the following conditions:

- a) fall/winter grazing that is currently being done under permit to Lost River Ranches will be allowed to continue at its present level;
- b) maximum season of use -- November 1 to April 30;
- c) Lost River Ranches will be the grazing contractor in the valley portion for the following reasons:
 - they have demonstrated good stewardship of the land;
 - their holdings are adjacent to the valley portion; and
 - fencing of the river flats and coulee breaks to prevent mixing of Lost River Ranch cattle with those of another contractor is impractical; and
- d) illegal grazing of the valley by cattle from the United States is an ongoing use. This activity will be monitored by the Public Lands Division and fencing may be required should this use adversely affect the Natural Area.

Ecological Reserve

As discussed previously in the Conservation Section (3.1), the management goal for the Ecological Reserve is to serve as a representative area of lush, mixed grass prairie in climax condition. As such the reserve will provide habitat for those species that require taller grasses and an accumulation of litter. An additional management goal for the reserve is to provide opportunities for research on grassland ecology, particularly in connection with climax conditions.

Grazing on the reserve may occur within the context of a research project that evaluates the effects and impacts of grazing on the climax community or other environments of the reserve. The ecological monitoring program for the Natural Area will be a key factor in planning grazing regimes associated with research in the reserve. Any grazing program will be planned with due consideration being given to the sensitivity of the springs and seepage areas in Kennedy Coulee.

3.5.2 Minerals and Aggregate

All activities associated with commercial resource exploration and extraction have significant impacts on the natural features and are incompatible with the overall management intent of the site.

Commercial resource exploration and extraction for minerals or aggregates, including petroleum and natural gas are not permitted except for that portion that has freehold mineral rights.

3.5.3 Linear Developments

No new linear developments such as bladed or graded road developments, pipelines or power lines are allowed in either the Natural Area or the Ecological Reserve.

3.5.4 Archeological and Paleontological Sites

The Milk River Canyon area has a rich archeological and paleontological histories (see Sections 2.2.6 and 2.2.7). In all situations, collection, excavation and disturbance of archeological and paleontological materials are prohibited under the *Historical Resources Act* unless authorized by the Minister of Culture and Multiculturalism. Before a permit is issued, those agencies outlined in Section 3.6 should be consulted.

3.6 Approval of Activities Discussed in Plan

Approvals for all management activities within the Natural Area must be obtained from the Natural and Protected Areas Manager and from the Regional Director for the Public Lands Division-Southern Region, after the review and endorsement of the Milk River Management Committee.

Requests for approval of management activities within the Ecological Reserve will be forwarded to the Regional Director of the Provincial Parks Service-Southern Region by the management committee. These requests will, in turn, be sent to the Ecological Reserves Steering Committee with final approval given by the Minister of Alberta Tourism, Parks and Recreation.

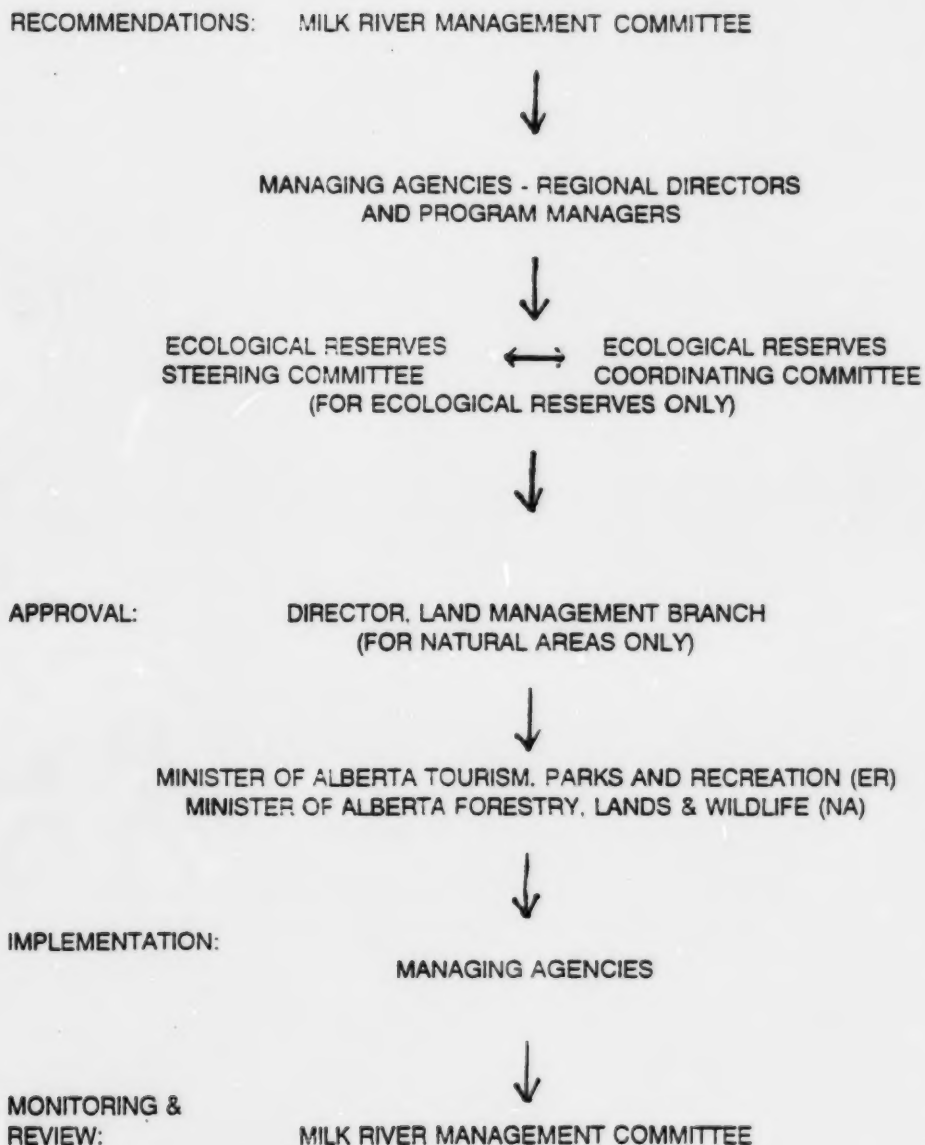
The approval process is outlined in Figure 5.

3.7 Approval of Activities Not Discussed in Plan

Specific potential activities may be identified that are not discussed in this plan. For these activities to be considered for approval they must meet the following criteria:

- a) be compatible with the overall objectives of the area;
- b) not damage rare, endangered or threatened species or their habitats; and
- c) be reviewed by the management committee and approved by the Natural and Protected Areas Manager and Regional Director of Public Lands-Southern Region for the Natural Area, and Regional Director of the Provincial Parks Service-Southern Region for the Ecological Reserve.

Figure 5. Management Activity Approval Process



4.0 PROGRAM SUPPORT

4.1 Physical Structures/Developments

4.1.1 Signs

In keeping with the wildland character of the site, signage will be kept to the minimum required to ensure public safety, to encourage compliance with management decisions such as those regarding vehicle use and campfires and to provide basic interpretive information. Road signs will be posted at strategic points to ensure that visitors seeking the plan area will reach their destination without ending up on other people's property. Signs advertising the site to attract additional visitors to the area will not be posted.

With the preceding philosophy in mind, the following points will be implemented by Public Lands Division, including the Natural and Protected Areas Section, and/or the Provincial Parks Service:

- a) One main sign will be placed at the entrance to the Milk River Natural Area (NW 21-1-6-W4M). This will indicate the following:
 - boundaries of the Natural Area and Ecological Reserve;
 - map with scale bar, fencelines and recommended route;
 - appropriate warnings (fire danger, travel at own risk);
 - significance and management of the site: large representative example of mixed grass prairie; canyon with its significant paleontological resources; rare species of plants and animals; unique geological features including igneous dike; diverse archeological resources; grazing is part of grassland ecosystem, though now features cattle; use respect -- leave things for others to enjoy; and
 - contact for further information:
 - Public Lands Division, Medicine Hat;
 - Natural and Protected Areas Section, Edmonton; and/or
 - Provincial Parks Service.
- b) Boundary marker signs depicting the Ecological Reserve will be strategically placed on braces of the fence that encircles it. Should monitoring indicate problems in the future, alternative strategies could vary from increasing signage to locking gates.
- c) Four small, earth tone road signs indicating the direction to the Natural Area/Ecological Reserve will be placed on right-of-ways, one at the Black Butte turn off of Secondary Highway 880, one at "Brower's corner" (see Figure 2), one at the Pinhorn corrals and one north of the Pinhorn corrals.
- d) All gates will be signed "Please leave gate as found."
- e) Appropriate signage will be placed at the terminus of the recommended route.

- f) The possibility of having a sign indicating foot access to the Ecological Reserve will be considered by the management committee.
- g) A sign will be erected on the river flats for those accessing the site by canoe. It will indicate the boundary of the site and some restrictions.
- h) Maintenance of these signs will be the responsibility of Public Lands Division, including Natural and Protected Areas Section, the Provincial Parks Service and/or any designated volunteer group or agency.

4.1.2 Fencing

- a) All fencing will be kept to a minimum.
- b) Fence routes and types are to be determined by the management committee. All feasible alternatives will be considered to accommodate any concerns regarding ease of access, any cost of construction and maintenance, flexibility for change, aesthetics, etc.
- c) Maintenance of the fencing between the Pinhorn Provincial Grazing Reserve and both the Natural Area and the Ecological Reserve is the responsibility of the managers of the Pinhorn Provincial Grazing Reserve.
- d) Construction of fencing (if necessary) will be the responsibility of the Public Lands Division. Maintenance of the fence between the Natural Area and the Ecological Reserve will be the responsibility of the grazing contractor while occupying the site and the Public Lands Division at all other times.
- e) Maintenance of the fence between the Ecological Reserve and the United States border is the responsibility of Alberta Tourism, Parks and Recreation.
- f) The upland and valley portions of the Natural Area may be separated by a semi-suspension fence in some places, as required by the management committee, near the canyon rim on the south side of the river. Its construction is the responsibility of the Public Lands Division and maintenance is the responsibility of the grazing contractor while occupying the site and the Public Lands Division at all other times.
- g) Fencing within the Natural Area at the international boundary is the responsibility of the grazing contractor while using the area and the Public Lands Division at all other times.
- h) The fence on the north end of the Natural Area is to be maintained by the adjacent landowner or grazing leaseholder.
- i) Should the monitoring, as suggested in Section 3.5.1 (m), indicate a need for additional fencing in order to protect rare and/or sensitive features, the management committee will be responsible for reviewing such change and taking the appropriate action.

4.1.3 Facilities

There are no existing facilities on either the Natural Area or Ecological Reserve. There will not be any facilities permitted in the Ecological Reserve and there is no intention of establishing facilities in the Natural Area. If there is demand for facility development (e.g., pit privies, garbage receptacles and temporary cattle corrals) the need and the location of such facilities will be determined by the management committee with approval of the Natural and Protected Areas Manager and Regional Director of the Public Lands Division-Southern Region for the Natural Area. Funding for construction and maintenance responsibilities must come from private sponsors and not from Alberta Forestry, Lands and Wildlife.

4.2 Regulations and Enforcement

Regulations are not necessary at this point in time. Signs and brochures will be used to encourage users to adhere to the proposed restrictions. Regulations may become necessary should activities start to adversely affect the site. Specific areas that may need attention for the Natural Area are the following:

- a) control of exotic species/pests/diseases;
- b) motorized vehicle use off of the recommended route;
- c) collection of materials;
- d) fires including campfires;
- e) road improvements; and
- f) reclamation.

Enforcement of existing legislation will be provided by various government agencies under their existing mandates. Enforcement roles and activities with the Kennedy Coulee Ecological Reserve need to be clarified, so that a transfer of responsibilities to the most appropriate administering agency can be effected.

Public Lands Division, upon advice from the management committee, will pursue the development of necessary regulations and appropriate enforcement mechanisms for the Natural Area. It will work in concert with Tourism, Parks and Recreation for those regulations needed for both the Natural Area and Ecological Reserve. Tourism, Parks and Recreation will attempt to resolve the enforcement issue in Kennedy Coulee Ecological Reserve.

4.3 Site Monitoring

Regular (semi-annual) on-site monitoring for both the Natural Area and the Ecological Reserve will be the responsibility of the members of the management committee and, primarily, the Public Lands Division and/or their designate (e.g., a volunteer steward under the Volunteer Steward Program of the Natural and Protected Areas Section).

Specific activities that require monitoring include the following:

- a) amount of random and organized public use especially that related to camping and off road vehicle use; and
- b) grassland management activities related to grazing such as fence condition surveys and salt block placement. A long-term monitoring program to evaluate grazing and fire as management tools is outlined in Section 3.5.1 (m). This program includes vegetation, wildlife and significant species components.

4.4 Communications

In both the Ecological Reserve and the Natural Area, any public communications must be approved by the Public Lands Division and/or the Provincial Parks Service, and as reviewed by the management committee. Any communications related specifically to either the Ecological Reserve or Natural Area will be the responsibility of the respective departments. Costs for additional communication items, such as a revised brochure for both the Natural Area and Ecological Reserve, road signs and the main entrance sign, will be shared jointly between Public Lands Division and Tourism, Parks and Recreation.

The Natural and Protected Areas Section will assume general responsibility for facilitating information exchanges between the management committee, government organizations, various user groups and other interested organizations and individuals.

Members of the management committee are encouraged to apprise members of their organizations of the guidelines put forth by the committee.

4.5 Volunteers

Volunteers from the public will be encouraged to participate in the management, monitoring and researching of both sites. A participant(s) in the Volunteer Steward Program will be sought by the Public Lands Division. The steward(s) will report to the management committee on their activities on an annual basis.

5.0 IMPLEMENTATION

5.1 Review and Amendments

This management plan will be reviewed annually by the management committee until they decide otherwise. The Public Lands Division will be responsible for organizing that review. Background information prepared for the annual review will include an annual report on all aspects related to the management guidelines, grazing plan and long-term monitoring. The report will include comments and recommendations received from the Milk River Management Committee or its successor and the Ecological Reserves Steering Committee (for the Ecological Reserve portion).

Should changes to the management plan be necessary, they will be endorsed by the Milk River Management Committee for both the Natural Area and Ecological Reserve. In addition, the Ecological Reserves Steering Committee will be consulted regarding endorsement for the Ecological Reserve. Amendments to the plan will be noted on a covering sheet at the beginning of the plan. The Public Lands Division of Alberta Forestry, Lands and Wildlife and Alberta Tourism, Parks and Recreation will coordinate all plan amendments, in consultation with public users of and agencies involved in the Natural Area and Ecological Reserve. The need for plan amendments can come from the management committee, individual sponsor groups or departmental staff of Alberta Forestry, Lands and Wildlife and/or Alberta Tourism, Parks and Recreation.

5.2 Administration

Under the *Wilderness Areas, Ecological Reserves and Natural Areas Act*, ecological reserves are ultimately the responsibility of the Minister of Tourism, Parks and Recreation and Natural Areas, the responsibility of the Minister of Forestry, Lands and Wildlife. Management advice will be provided by the Ecological Reserves Coordinating and Steering Committees for the Ecological Reserve, and, by the Milk River Management Committee for both sites. Terms of Reference for the Milk River Management Committee are provided in Appendix 1.

The membership of the Milk River Management Committee will consist of the following:

- representative of Public Lands-Southern Region (preferably local field personnel whose area of responsibility covers the Milk River region);
- resource person from Natural and Protected Areas Section;
- representative from Fish and Wildlife Division-Southern Region (to be appointed by Regional Director-Southern Region);
- representative from the Provincial Parks Service (to be appointed by the Regional Director-Southern Region);
- representative from local municipal district (the County of Forty Mile No. 8);

- representative from the Alberta Wilderness Association;
- representative from the Foremost Fish and Game Association;
- representative from the ranching community with no interest in grazing the Natural Area;
- local MLA (ex officio); and
- Southern Alberta Environmental Group.

Initially the committee will be chaired by a representative of the Regional Coordination Services, Alberta Forestry, Lands and Wildlife. The committee will meet at least annually and shall provide advice to the Ministers on revisions to the management guidelines of any management issues related to the two sites.

5.3 Where to go From Here?

This plan was developed to set out the management intent for the Milk River Natural Area and Kennedy Coulee Ecological Reserve.

Staff of Alberta Forestry, Lands and Wildlife and Alberta Tourism, Parks and Recreation will continue to work closely with the County of Forty Mile, the Alberta Wilderness Association, the Foremost Fish and Game Association, other members of the management committee and other interested groups or individuals as they are identified in the implementation of this plan. Amendments to the plan will be addressed as outlined in Section 5.1.

5.4 Information Required

Several gaps in the existing information base became apparent during the preparation of this plan. It is also apparent that as our knowledge of the site and its components increases, our realization of the complexity of the mixed grassland ecosystem will also increase. It is, therefore, acknowledged that information collected from the site may point to the need for more research in order to fulfill our overall goal of conservation of this unique ecosystem.

The following are immediate needs for information:

- a) detailed inventory work of the Ecological Reserve including the mapping of populations of rare species;
- b) detailed studies of animal communities for both the Natural Area and Ecological Reserve;
- c) detailed studies of the population biology of rare and/or representative species; and
- d) detailed studies on the effect of grazing and fire on populations of rare species.

Funding for such projects should ideally come from the proceeds of grazing. In lieu of this, some monies may be provided for one or all of these projects by the Natural and Protected Areas Section and/or Alberta Tourism, Parks and Recreation. Alternative sources of funds should also be pursued. Volunteer organizations should also be encouraged to contribute any information on the site.

5.5 For Further Information

If you would like further information on this plan or the Milk River Natural Area, or, if you would like to provide comments on this plan, please contact the following:

NATURAL AND PROTECTED AREAS SECTION

Alberta Forestry, Lands and Wildlife
4th Floor, Petroleum Plaza, South Tower
9915 - 108 Street
EDMONTON, Alberta T5K 2C9
(403) 427 - 5209

OR

PUBLIC LANDS DIVISION

Alberta Forestry, Lands and Wildlife
Room 106
346 - 3rd Street S.E.
MEDICINE HAT, Alberta T1A 0G7
(403) 529 - 3677

For further information on the Kennedy Coulee Ecological Reserve, please contact the following:

PROVINCIAL PARKS SERVICE

Alberta Tourism, Parks and Recreation
VULCAN, Alberta T0L 2B0
(403) 485 - 2261

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APPENDIX I

TERMS OF REFERENCE

MILK RIVER MANAGEMENT COMMITTEE

TERMS OF REFERENCE FOR THE MILK RIVER MANAGEMENT COMMITTEE

- Authority:** - Initiated by Alberta Forestry, Lands and Wildlife. The committee is advisory -- responsible for making recommendations about resource use and management on the Milk River Natural Area and Kennedy Coulee Ecological Reserve.
- Recommendations will be acted on by the land managers (regional management issues - Southern Regional Resource Management Committee).
- Purpose:** - To protect and maintain the ecological and aesthetic character of the Mixed Grassland Region with minimal human interference.
- Periodic Evaluation:** - The committee will evaluate its performance, continued relevance and future at five-year intervals. The first such evaluation will be completed by December 31, 1994.
- Function:** - 1. To develop a management plan providing site-specific direction to guide the future use and management of both the Natural Area and Ecological Reserve.
- 2. To coordinate the following: the implementation of the management plan, the monitoring and evaluation of implementation progress, a review of amendment recommendations, and a major review of the plan as required.
- Meeting Schedule:** - Initially, meetings will be scheduled frequently to develop and review the draft operational management plan. After plan approval, the committee shall meet a minimum of once a year. Additional meetings may occur as scheduled by the committee.
- Membership:** - 1. Membership of the committee is as follows:
- Alberta Fish and Wildlife
 - Alberta Public Lands (Regional Field Services and Natural and Protected Areas)
 - Alberta Tourism, Parks and Recreation
 - Alberta Wilderness Association
 - County of Forty Mile No. 8
 - Foremost Fish and Game Association
 - Local ranchers
 - MLA, Cypress-Redcliff Constituency (ex officio)
 - Regional Coordination Services, Southern Region
 - Southern Alberta Environmental Group

2. Changes in committee membership may be made with unanimous consent. Once a management plan is approved, a smaller committee may be desirable.

3. The committee will review chairmanship on an annual basis. Initially, the Regional Resource Coordinator, Alberta Forestry, Lands and Wildlife will act as chairman.

Record of - Minutes will be kept of all committee meetings and distributed
Observations: to the committee members.

Citizen - 1. Following committee approval presentations may be
Participation: invited by members of the public or any non-member
public group or organization on subjects of interest to
the committee.
2. Recommendations can be made by the committee to
present the draft management plan for public review
before approval.

APPENDIX 2. LIST OF SCIENTIFIC NAMES OF PLANTS MENTIONED IN TEXT

This list consists only of those names mentioned in the text. A complete list of species is found in Achuff et al. (1988), and Wallis (1976, 1989).

COMMON NAME ^a	SCIENTIFIC NAME
northern wheat grass	<u>Agropyron dasystachyum</u> (Hook.) Scribn.
western wheat grass	<u>Agropyron smithii</u> Rydb.
saskatoon	<u>Amelanchier alnifolia</u> Nutt.
cushion everlasting	<u>Antennaria dimorpha</u> (Nutt.) T. & G.
broad-leaved everlasting	<u>Antennaria neglecta</u> Greene
red three-awn	<u>Aristida longiseta</u> Steud.
sagebrush	<u>Artemesia cana</u> Pursh
pasture sagewort	<u>Artemesia frigida</u> Willd.
long-leaved sage	<u>Artemesia longifolia</u> Nutt.
Pursh's milk vetch	<u>Astragalus purshii</u> Dougl. ex Hook.
silver saltbush	<u>Atriplex argentea</u> Nutt.
Nuttall's atriplex	<u>Atriplex nuttallii</u> S. Wats.
water birch	<u>Betula occidentalis</u> Hook.
smooth boisduvalia	<u>Boisduvalia glabella</u> (Nutt.) Walp.
blue grama	<u>Bouteloua gracilis</u> (HBK.) Lag.
sand grass	<u>Calamovilfa longifolia</u> (Hook.) Scribn.
sedges	<u>Carex</u> spp.
rabbitbrush	<u>Chrysothamnus nauseosus</u> (Pall.) Britt.
red-osier dogwood	<u>Cornus canadensis</u> L.
hawk's-beard	<u>Crepis atrabarba</u> Heller
small-flowered hawk's-beard	<u>Crepis occidentalis</u> Nutt.
California oat grass	<u>Danthonia californica</u> Boland

one-spike oat grass	<u>Danthonia unispicata</u> (Thurb.) Munro
dwarf fleabane	<u>Erigeron radicans</u> Hook.
nodding umbrella-plant	<u>Eriogonum cernuum</u> Nutt.
butte marigold	<u>Hymenoxys acaulis</u> (Pursh) Parker
povertyweed	<u>Iva axillaris</u> Pursh
June grass	<u>Koeleria macrantha</u> (Ledeb.) J.A. Schultes
scratch grass	<u>Muhlenbergia asperifolia</u> (Nees & Mey.) Parodi
mat muhly	<u>Muhlenbergia richardsonis</u> (Trin.) Rydb.
spiked water-milfoil	<u>Myriophyllum exalbescens</u> Fern.
mousetail	<u>Myosurus aristatus</u> Benth. ex Hook.
prairie false dandelion	<u>Nothocalais cuspidata</u> (Pursh) Green
upland evening primrose	<u>Oenothera andina</u> Nutt.
American pellitory	<u>Parietaria pensylvanica</u> Muhl. ex Willd.
white prairie-clover	<u>Petalostemon candidum</u> (Willd.) Michx.
purple prairie-clover	<u>Petalostemon purpureum</u> (Vent.) Rydb.
moss phlox	<u>Phlox hoodii</u> Richards.
Sandberg bluegrass	<u>Poa sandbergii</u> Vasey
bluegrass	<u>Poa</u> spp.
Watson's knotweed	<u>Polygonum watsonii</u> Small
smartweeds	<u>Polygonum</u> spp.
lance-leaf cottonwood	<u>Populus x acuminata</u> Rydb.
choke cherry	<u>Prunus virginiana</u> L.
woollyheads	<u>Psilocarphus elatior</u> A. Gray
large-leaved watercrowfoot	<u>Ranunculus aquatilis</u> L.
wild gooseberry	<u>Ribes oxycanthoides</u> L.
slender cress	<u>Rorippa tenerrima</u> Greene
common wild rose	<u>Rosa woodsii</u> Lindl.
arrow-leaved arrowhead	<u>Sagittaria cuneata</u> Sheld.
yellow willow	<u>Salix lutea</u> Nutt.
greasewood	<u>Sarcobatus vermiculatus</u> (Hook.) Torr.
common great bulrush	<u>Scirpus validus</u> Vahl
prairie selaginella	<u>Selaginella densa</u> Rydb.

thorny buffaloberry	<u>Shepherdia argentea</u> Nutt.
needle and thread	<u>Stipa comata</u> Trin. & Rupr.
green needle grass	<u>Stipa viridula</u> Trin.
sea-blite	<u>Suaeda moquinii</u> (Torr.) Greene
buckbrush	<u>Symphoricarpos occidentalis</u> Hook.
golden bean	<u>Thermopsis rhombifolia</u> (Nutt.) Richards.
common cattail	<u>Typha latifolia</u> L.
death camas	<u>Zigadenus venenosus</u> S. Wats.

^a Taxonomy and common names according to Editorial Services (1990).

APPENDIX 3. LIST OF RESTRICTED WEEDS AS DESIGNATED BY THE WEED CONTROL ACT AND THE COUNTY OF FORTY MILE NO. 8

The following list includes all restricted weeds as designated by the *Weed Control Act* (1980) and the County of Forty Mile No. 8 (1986). Square brackets [] indicate nomenclature according to Editorial Services (1990).

- a) red bartsia [late-flowering eyebright] - Odontites serotina (Lam.) Dam.
- b) diffuse knapweed - Centaurea diffusa Lam.
- c) spotted knapweed - Centaurea maculosa Lam.
- d) nodding thistle - Carduus nutans L.
- e) Eurasian water milfoil - Myriophyllum spicatum L.
[spiked water milfoil - Myriophyllum exalbescens Fern.]
- f) hoary cress - Cardaria spp.
- g) leafy spurge - Euphorbia esula L.
- h) butter-and-eggs - Linaria vulgaris Hill
- i) scentless chamomile - Matricaria maritima L.
[Matricaria perforata Merat]